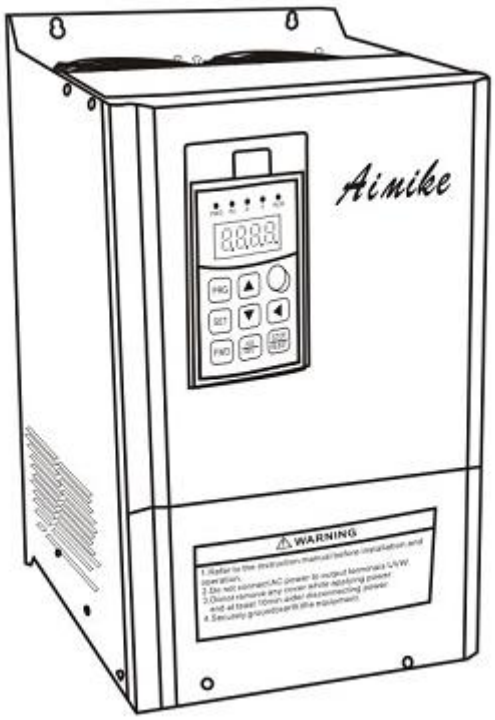
Aimike®

AMK3500 Magnetic flow Vector Inverter

User's Manual



Shenzhen Aimike Electric Co.,Ltd

Preface

Thank you for you choose our AMK3500 mini inverter researched and developed independently by our company.

AMK3500 series inverter adopts advanced technology of magnetic flux vector control,achieved performance motor control even it is not sensitive to the motor parameter.It made the full frequency high torque output and fast response and good load adaptability, high speed control accuracy and good reliability to become a reality, so this is a good choose to meet the higher requirements of high performance general purpose inverter.

AMK3500 series inverter is the products combined the customer demand with the organic demand,providing input and output terminal practical PID regulation and function of constant pressure water supply, simple PC, programmable control, remote control, synchronization of multiple pulse frequency setting and other special inverter control powerful function for the customer,providing highly integrated solutions for our customers equipment manufacturing and automation engineering, also can reduce the cost of the system, and has a very high value to improve the reliability of the system.

This manual help people to instal the equipment, set the operation parameters, diagnose the fault.To correct install and operate the series of products, before you use AMK3500 series inverter, please read this manual carefully.

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Chapter I Safety Precautions and Inverter Series Models

1.1 Safety Precautions

1.Can not be installed in the containing explosive gas environment.It may have the risk of bomb.

2.Please ask professional electrical engineering personnel to take wiring operation. It may have danger of electric shock and fire.

Please confirm the input power has been cut before wiring. It may have danger of electric shock and fire.

3.Don’t touch the wiring terminal of inverter. It has high voltage on terminals. It may have danger of electric shock.

4.When used on frequency earthing terminal, please according to the provisions of national electrical safety and other relevant standards, correct and reliable grounding.

5.Shut off the power supply, do not touch the circuit board and any parts when the keyboard and display out within 5 minutes, and must be used to confirm the machine has to discharge meter, square can be implemented in machine, otherwise there is the risk of electric shock.

6.Don’t connect input power wires on output U, V and W terminals.It may cause internal damage of inverter if voltage is added on output terminals.

7.MOS integrated circuit is installed on keyboard, control circuit board and driving circuit board. Electrostatic induction may damage the integrated chip on the circuit board if using finger to touch the circuit board directly.

8.Don't let screw, gasket or other metal fall into the inside drive.It may have danger of fire and cause the damage of inverter..

5.Don’t connect phase shifting capacitor and LC/RC noise filter on output circuit.

It may cause internal damage of inverter.

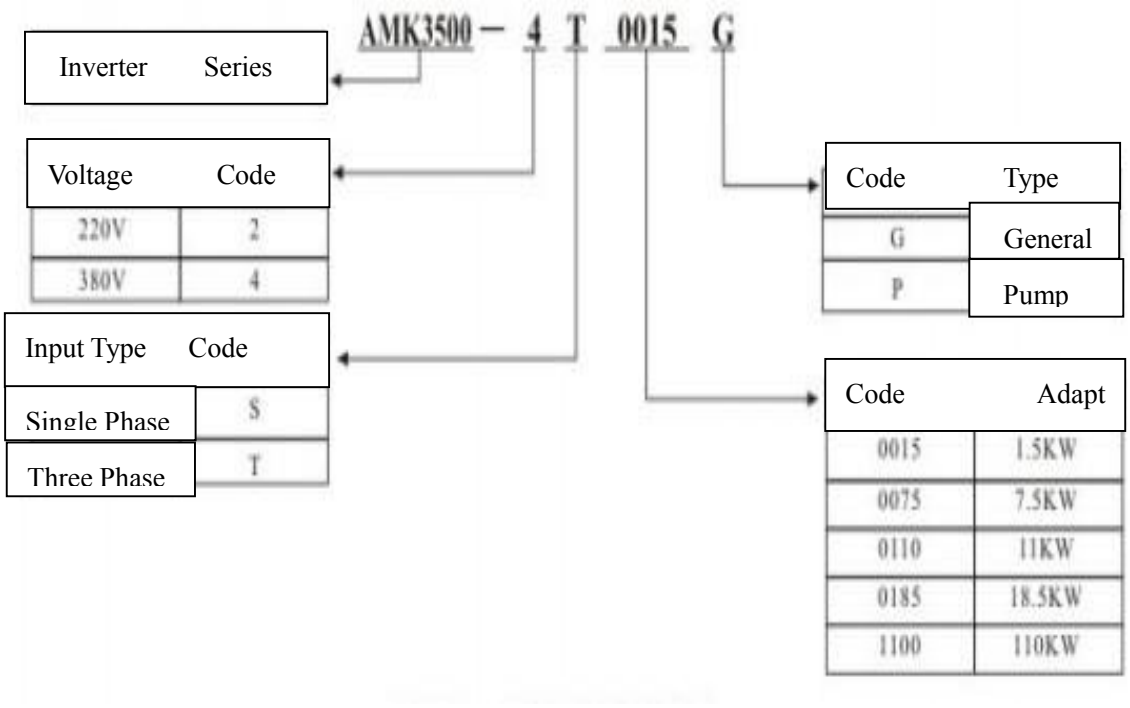
9.Never connect AC 220V to the internal terminals on the frequency inverter, otherwise it will seriously damage the inverter.

10. If appearing overcurrent protection after start, please confirm the external wiring is correct, then run on electricity.

11.Please don't use the brake pull mode (power) to stop ,after the motor stop then disconnecting the power supply.

12.Do not install in direct sunlight.

1.2 Specifiocation Description of Inverter Model



1.3 Inverter Series Models

AMK3500 series inverter has 380V voltage class. Adaptive motor power range is 4KW-630KW. Models of AMK3500 series inverter are as in Table 1-2.

Voltage	Model	Rated capacity (KVA)	Rated output Current (A)	Adapt Motor (KW)
380V三相	AMK3500-4T0007G	1.5	2.3	0.75
	AMK3500-4T0015G	3.7	3.7	1.5
	AMK3500-4T0022G	4.7	5.0	2.2
	AMK3500-4T0040G	6.1	8.5	4.0
	AMK3500-4T0055G	11	13.0	5.5
	AMK3500-4T0075G	14	17.0	7.5
	AMK3500-4T0110G	21	25.0	11
	AMK3500-4T0150G	26	33.0	15
	AMK3500-4T0185G	31	39.0	18.5
	AMK3500-4T0220G	37	45.0	22
	AMK3500-4T0300G	50	60.0	30
	AMK3500-4T0370G	61	75.0	37
	AMK3500-4T0450G	73	90.0	45
	AMK3500-4T0550G	98	110.0	55
	AMK3500-4T0750G	130	150.0	75
	AMK3500-4T0930G	170	176.0	90
	AMK3500-4T1100G	138	210.0	110
	AMK3500-4T1320G	167	250.0	132
	AMK3500-4T1600G	230	310.0	160
	AMK3500-4T2000G	250	380.0	200
	AMK3500-4T2200G	280	415.0	220
	AMK3500-4T2450G	340	475.0	245
	AMK3500-4T2800G	450	510.0	280
	AMK3500-4T3150G	460	605	315
220V单相/三相	AMK3500-2S0007G	1.4	4.0	0.75
	AMK3500-2S0015G	2.6	7.0	1.5
	AMK3500-2S0022G	3.8	10.0	2.2

1-2

Chapter II Inverter Installation and Distribution

Danger

1. Please confirm the input power has been cut before wiring.
It may have danger of electric shock and fire.
2. Please ask professional electrical engineering personnel to take wiring operation.
It may have danger of electric shock and fire.
3. The earthing terminal must be earthed reliably.
It may have danger of electric shock.
4. After emergency shutdown terminal is connected, it must check whether its action is effective.
It may have danger of injury. (Wiring responsibilities shall be undertaken by the user.)
5. Don't touch the output terminal directly. The output terminal of inverter shall not be connected with the shell. Don't connect short circuit between terminals.
It may have danger of electric shock and causing short circuit.
6. Don't touch the wiring terminal of inverter. It has high voltage on terminals.
It may have danger of electric shock.
7.When cut off the power supply, waiting 5 to 8 minutes to allow the machine in the remaining electricity basically cleaned, then it can carry out inspection and maintenance.
8. Don't take maintenance and inspection operation for non professional technicians.
It may have danger of electric shock.

Notes

1. Please confirm whether AC main circuit power is consistent with the rated voltage of inverter.
It may have danger of injury and fire.
2. Please connect brake resistor or brake unit according to the wiring diagram.
It may have danger of fire.
3. Please use screwdriver with appointed moment to fasten terminals.
It may have danger of fire.
4. Don't connect input power wires on output U, V and W terminals.
It may cause internal damage of inverter if voltage is added on output terminals.
5. Do not remove the front panel mask, wiring is only needed to remove the cover of terminal.
It may cause the damage of the inside of inverter.

2.1 Installation Environments

(1) It is prohibited to be installed at sites with corrosive, explosive gases and dust,without direct sunlight.

(2) Humidity requirement shall be lower than 95%RH.

(3) It's vibration less than 5.9 m/s2.

(4) It shall be away from sources of electromagnetic interference.

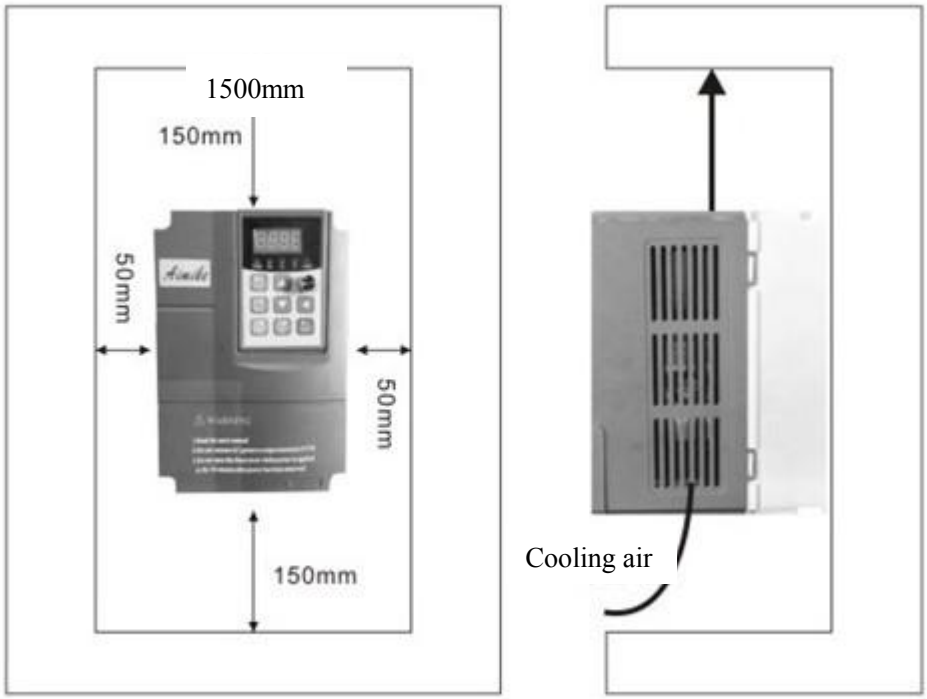
(5)It shall be installed indoor with good ventilation. Ambient temperature requirement is within the range of -0℃-40℃. If the temperature is more than 40℃, it needs external forced cooling or derating using.

(6)Please use the electric control box or remote control mode when install nonstandard environment, must pay attention to the ventilation and heat radiation.

The installation environment and use have a great influence on the life of inverter, but if all meet the installation environment requirements, if the inverter continuous use for a long time, the service life of the electrolytic capacitors no more than 5 years and the life of cooling fan about 3 years. We recommend that you update or high maintenance of frequency converter in advance.

2.2 The installation direction and space

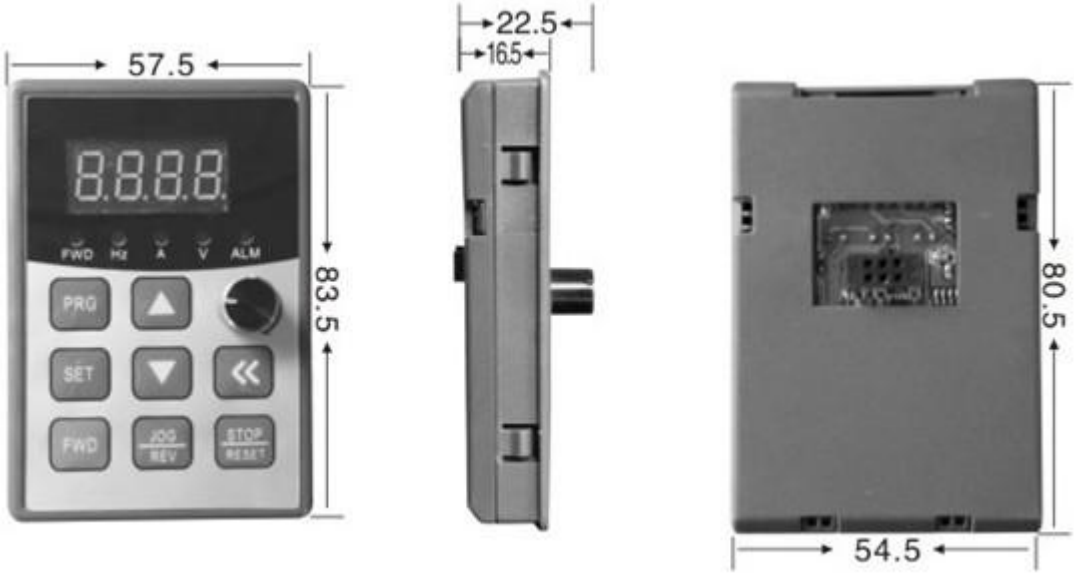
Generally, it shall be installed vertically. And install as in Fig 2-2 to keep enough space.



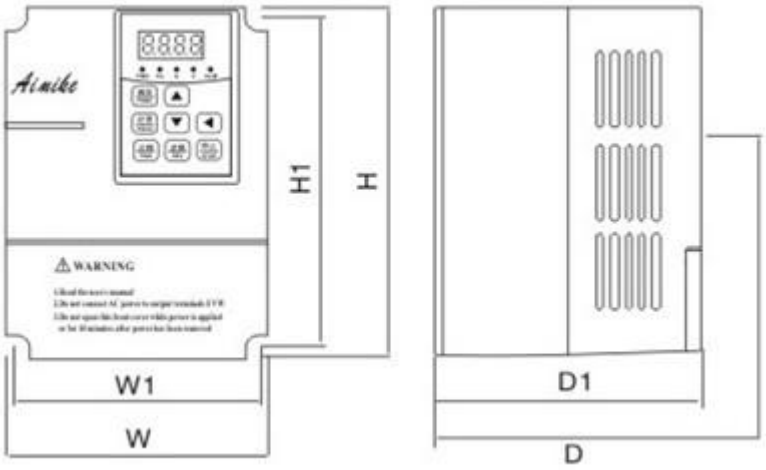
2-2

2.3 Appearance Description and size

Control Panel Unit: mm [inch]

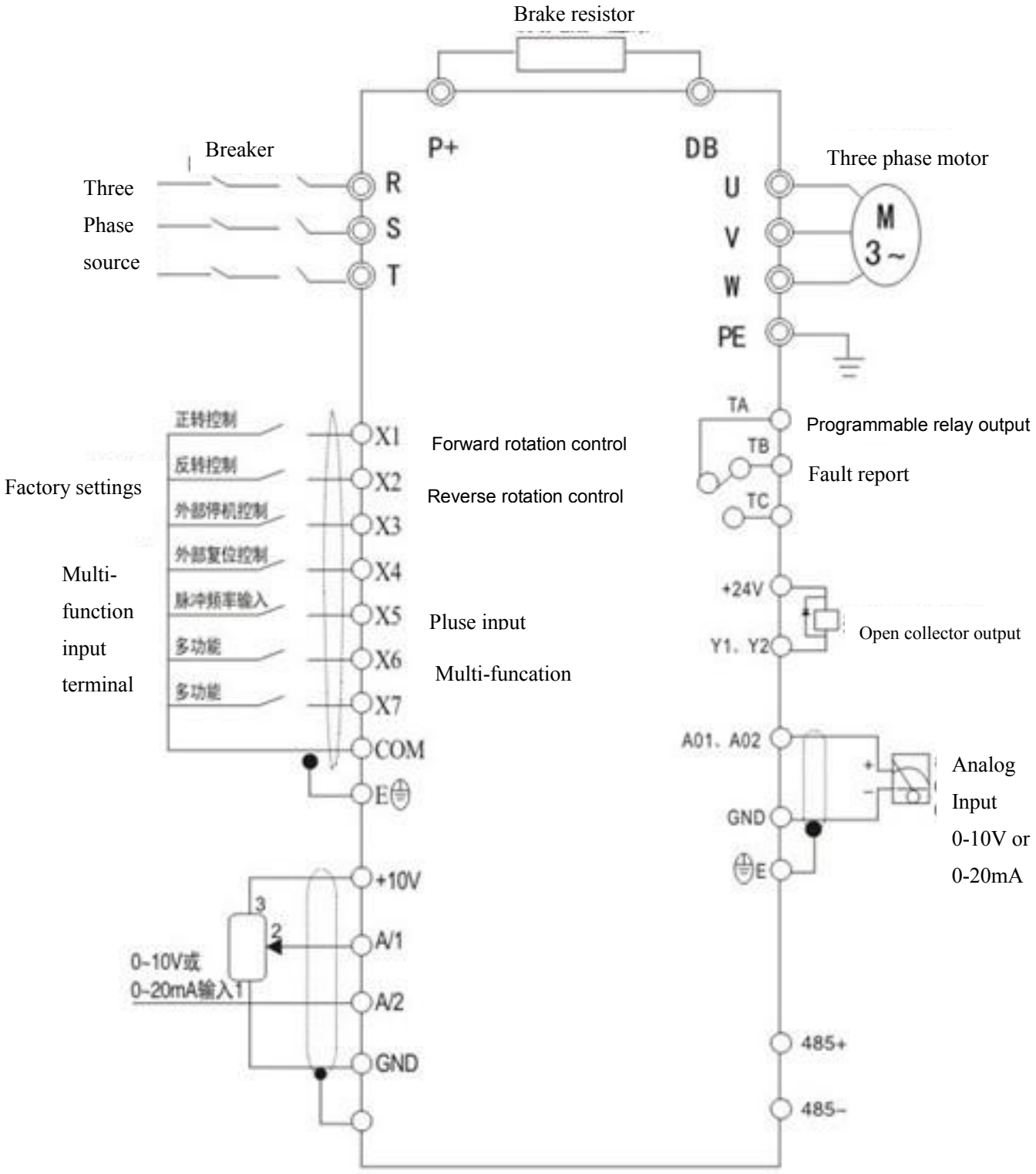


Whole Structure Unit: mm [inch]

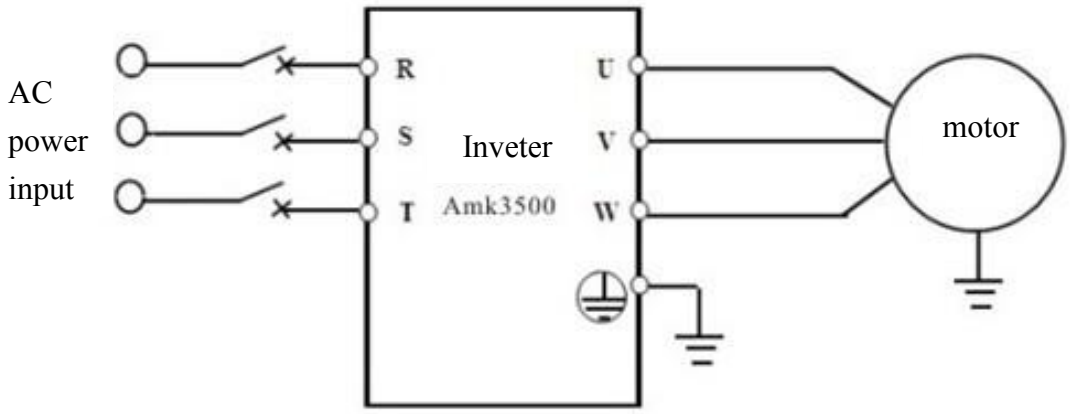


Model No.	AC	W1 (mm)	W (mm)	H1 (mm)	H (mm)	D1 (mm)	D (mm)	Install (mm)	Shell (Type)
AMK3500-2S0007G	4.0	76	85	143	152	112.5	119.5	M4	Plast -ic
AMK3500-2S0015G	7.0	76	85	143	152	112.5	119.5		
AMK3500-2S0022G	10.0	108	125	157	170	135	145		
AMK3500-4T0007G	2.3	108	125	157	170	135	145	M4	Plast -ic
AMK3500-4T0015G	3.7								
AMK3500-4T0022G	4.7								
AMK3500-4T0040G	8.5								

2.4 Basic Operation Distribution Diagram



2.6 Distribution of Main Circuit Terminals



2.7 Table of Main Circuit Terminals

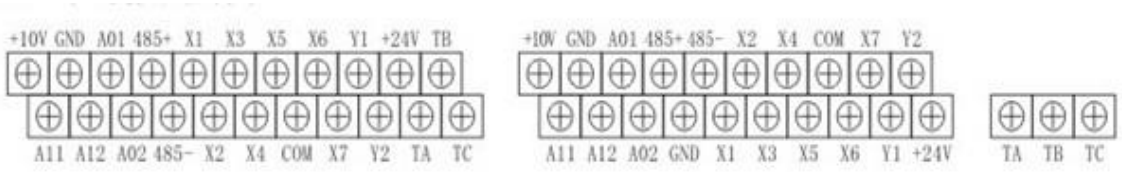
Series	Adapt Motor
G	AMK3500-2S004-AMK3500-2S0015

Terminal Code	Funcational Specifications
L1 L2	Grid ac power input
P+ PR	External braking ac motor
U V W	Three phase ac motor
G	Earthing terminal

Series	Adapt Motor
G	AMK3500-4T0007G-AMK3500-4T0040G

Terminal Code	Funcational Specifications
P+BR	Braking resistor terminal
R S T	Grid ac power input
PE	Earthing terminal
U V W	Three phase ac motor

2.8 Terminals of control circuit


+10V GND AO1 485+ X1 X3 X5 X6 Y1 +24V TB
A11 A12 AO2 485- X2 X4 COM X7 Y2 TA TC
+10V GND AO1 485+ 485- X2 X4 COM X7 Y2
A11 A12 AO2 GND X1 X3 X5 X6 Y1 +24V
TA TB TC

2.9 Adapt 0.4-1.5kw 220V Adapt 0.75-3.7kw 380V

Type	Terminal Tab	Terminal Function Description	Specification
Multi-functional input terminals	X1	It's effective when X and COM short circuit, its function respectively set by parameters of F5.00-F5.04,(common port:COM).	Input,0-24Vlevel signal, Low Level effective，5mA
	X2		
	X3		
	X4		
	X5	When it short circuit between X5 and COM , X5 can not only be used for general multi function terminal use, but also be programmed as high-speed pulse input terminal, see F5.04 function.	
	X6/X7	Can be chose as expanded input terminals, signal type as same as X1-X4.	
Digital signal output terminals	Y1	2 multifunctional programmable open circuit output. It can be programmed and defined as multiple functional switching value output terminals. (common port :CME)	Outpur, Max output current: 50mA
	Y2		
Analogy quantity input	AI1	AI1 can receive voltage/current signal input which choose by JP2, the factory default voltage,if input is current,it just need put the middle jumper cap short circuit with Cin terminal; AI2 can justreceive input voltage, the setting range see F6.00 -F6.07.(reference ground:GND)	Input,voltage:0-10V(input impedance:100KΩ), current:0-20mA(input impedance:500KΩ)
	AI2		
	A01	It provides analogy quantity voltage /current output.It can express to 13 kinds of physical values, Output	Output:0-10V dc voltage. The output voltage of A01、A02 terminal is come from

	A02	voltage or current signal is selected by jump line. factory default output voltage, ,if input is current,it just need put the middle jumper cap short circuit with Cout terminal; A02 and X5 can use again,see F6.18 -F6.22 (Reference ground: GND)	PWM wave of central processor.The size of output voltage waveform is proportional to the pulse width of PWM wave.
Relay output terminal	TA	Programmable defined as output terminal of multifunctional , reach to 15. See F5.12	TA-TB:usually close;TA-TC:usually open. Contact rated value 250VAC/2A(COSΦ=1); 250VAC/1A(COSΦ=0.4); 30VDC/1A
	TB		
	TC		
Power	24V	common power of digital signal iutput terminal	Max output current: 200mA
	10V	common power of analogy input output terminal	Max output current: 20mA
	COM	reference ground of digital signal and power 24v	Mutual internal isolation of GND
	GND	reference ground of analogy signal and power 10V	Mutual internal isolation of COM
Communication	485+	Positive end of RS 485 differential signal	Standard RS485 communication interface, please use stranded wire or shielded wires
	485-	Negative end of RS 485 differential signal	

Control terminal AI1 can input voltage signal, and also can input current signal, while AI2 can only input voltage signal； users should be based on the signal type, make corresponding jumper selection in the main control board.

Connected with a weak analog signal , vulnerable to external interference effect, so the wiring should be as short as possible.Inverter control line need to be equipped with external isolation device or use the shielded wire and grounding requirements.

The input command signal line and the frequency table connection except ban, also should walk the line alone, it is best to stay away from the main circuit wiring.

The main control circuit wiring shall be greater than 0.75m ㎡, recommend the use of shielded twisted pair. Tin or cold pressed metal joints shall be the control circuit terminal wiring.

Connected with an analog signal output device, sometimes thanks to interference of inverter make appear malfunction, when this happens, it can connect capacitor or ferrite rings in the external analog output device.

2.10 Wiring precautions

※ When remove motor, it must cut off the input power supply converter.

※ It can switch of motor or power supply when stop the output of inverter.

※ To minimize the impact of electromagnetic interference, when the distance between the electromagnetic contactor ,relay and inverter is close,it should consider the installation of surge absorption device.

※ It is prohibited to connect the power line with output terminals U, V, W of the inverter.

※ Inverter control line need to be equipped with external isolation device or use the shielded wire.

※ The input command signal line except ban, should walk the line alone, it is best to stay away from the main circuit wiring.

※ when the carrier frequency is less than 4KHz, the maximum distance between inverter and motor should be within 50 meters, while the carrier frequency is more than 4KHz, it should be appropriatea to reduce this distance, the best laid is in the gold wiring.

※ When the frequency converter with the peripheral equipment (filter, reactor), it should use 1000 volt megger to measure it's geopolitical resistance, ensure that not less than 4 megohm.

※ It is prohibited to connect capacitance or resistance with output terminals U, V, W of the inverter.

※ If the inverter start more frequent, do not power off, it must use the control terminal COM/RUN as start stop operation, so as to avoid damage to the bridge rectifier.

※ To prevent accidents, the ground terminal of G must be reliable grounding (earthing impedance should be low than 100Ω), otherwise there will be leakage situation occurs.

※ Please according to relevant provisions of the national electrical wiring regulations to choose wiring line diameter specifications.

2.11 Redundant circuit

In the inverter fault or jump off may have a greater loss of shutdown or other fault.Proposed alternative line in this case, to ensure safety.

Note:Alternative line must to confirm the validation and testing operation characteristics, ensure that the power frequency and inverter phase rotation.

Chapter III Control panel and methods

3.1The panel layout

Operation keyboard is the main unit of inverter to receive orders and display parameters. The appearance of operation keyboard is as in Fig 1:

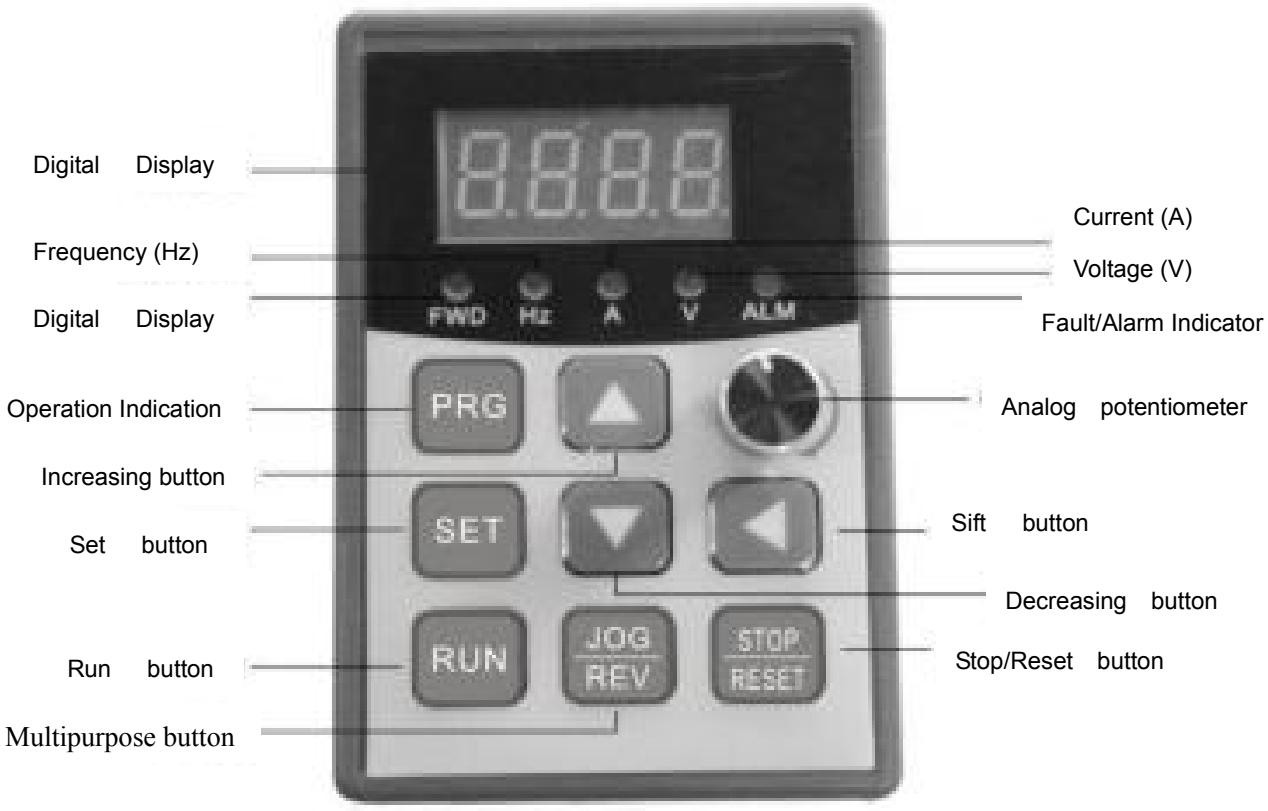
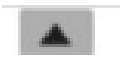


Fig 1

On o[operation of inverter, it sets 9 buttons. The function of each button is defined as follows:

Button	Name	Function Description
	Shift /Monitor Mutton	Under editing condition, it can select modification bit of set data. Under other status, it can switch display monitoring parameters.
	Multi-function button	Set effective factory defaults according to F0.16, Jog control
	Analog potentiometer	Use as frequency given; when F0.05=0, Analog potentiometer setting as given frequency.

	Program/Exit Button	Enter into or exit the programming status.
	Increasing button	Increasing of data or function code.
	Set button	Enter next menu level or data confirmation.
	Run button	Under operation keyboard mode, press the button to operation the inverter.
	Decreasing button	Decreasing of data or function code
	Stop / Reset button	Under normal operation status, if the inverter operation channel is set as effective keyboard stop method, press the button and the machine is stopped according to set mode. Under fault condition, press the button and the inverter is reset and back to normal stop status.

3.2LED digital tube and lights indicate

Item		Function Description	Symbol
Display Function	LED Indicator	LED display frequency parameters,the indicator light.	Hz
	Current/voltage Indicator	LED display current parameters,the indicator is green;LED display voltage parameters,the indicator is red.	A/V
	ALM	Alarming indicator. It means that the inverter is appears fault.	ALM
	F/R	When the indicator is red, it means the inverter is in position running status. When the indicator is green, it means the inverter is in negative running status.	F/R

The operating panel is provided with a four bit 8 LED digital tube, 2 units of the indicating lamp, the 2 state indicating lamp, as shown in Fig 1. Digital tube can be real state parameter, the function code parameters, fault alarm code of inverter. The 2 unit indicator light corresponding to three types of unit indicator. The 2 state indicating lamp are respectively positive inversion and warning status indication. The indicator light is explained as follows:

Unit Indicator and Combination Description

LED Indicator Combination	Meaning of LCD display	Symbol
Hz+A	Motor speed Speed	r/min
A+V	Time(second)	s
Hz+V	Percentage of the actual value	%

Hz+A+V	Temperature	℃

3.3 Setting method of ordinary function parameters

Function parameter system of the inverter includes function codes F0-FF, group E and group D and other group,totually 17 group. Each functional group includes several functional codes. Function code adopts (function code group No. + Function code) method for identification, e.g. "F5.07" means the 7th function code of 5th group of function.

The menu structure of LED keyboard unit: through the display unit of LED keyboard to set function code, functional group number corresponding to previous menu, the function code number corresponding to second-level menu, the function code parameters corresponding to three level menu.

Function code setting example:

Example 1: Change the jogging frequency setting of forward rotation from 0Hz to 10Hz (F1.15 is changed from 0.00Hz to 10.00Hz).

(1) Press PRG button and enter into programming status. LED Nixie light displays functional parameter P0.00 and flicker bit is stopped at the unit.

(2) Press ▶▶ button and it can see the flicker bit is moved at hundreds place, the 2th 、3th unit need not to change, just Press ▶▶ and flicker bit is stopped at the 3th unit.

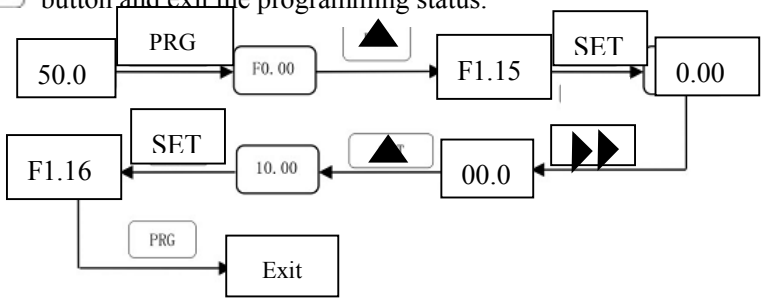
(3) Press ▲ button change the 0 of 3th unit on LED to 1, then Press ▶▶ flicker bit is stopped at the 2th unit,abd change 0 to 1, next press ▶▶ flicker bit is stopped at the 1th unit then change 0 to 5, the LED Nixie light display F1.16.

(4) Press SET button and it can see F1.15 corresponding data (0.0). At the same time, the unit frequency corresponding LED (Hz) is on.

(5) Press ▶▶ button and the flicker bit is moved to top digit "3". Press one times of ▲ button and it is changed into 10.00.

(6) Press SET button and save F1.15 value and display next function code (F1.16) automatically.

(7) Press PRG button and exit the programming status.



Example 2: Monitoring Parameter Item d-04 Checking (Output Current)

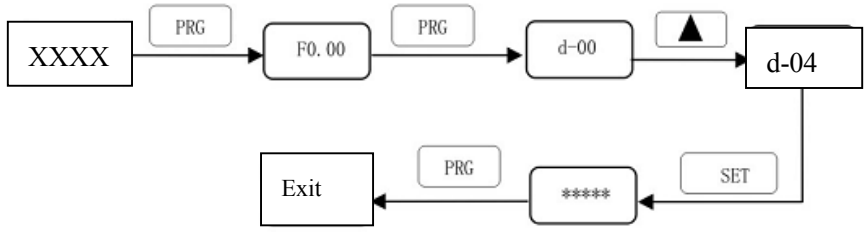
Method 1:

(1) Press PRG button and enter into programming status. LED Nixie light displays functional

parameter F0.00. Press PRG again, and Nixie light displays functional parameter d0.00. Flicker bit is stopped at the unit. Adjust ▲ button until the monitoring code item displays d-04.

(2) Press SET button, and it will see corresponding data of d-04. Furthermore, the unit "A" corresponding light-emitting diode (A) is on.

(3) Press PRG button and exit the monitoring status.



Method 2:

On monitoring interface,press SET button under specific monitoring mode interface, and skip to next monitoring parameter item d-xx. Readjust ▲ or ▼ button until the monitoring code display d-04, and it can achieve until procedure (2) and (3) in Method 1.

Method 3:

1) Use the method 1 to set FC.01 to 4.

2) Press SET button and save FC.01 value and display next function code automatically.

3) Press PRG button and exit the monitoring status.

4) The value display on monitoring page is corresponding data of d-04.

3.4 Setting method of specifical function parameters

First class: The default display is a decimal number, press ▶▶ button can be switched to blank (MSB at this time can be set numerical -- thousand place)

Eg:The F0.13 is set to 1000.5s, step as follows:

(1) The method of enter into the setup of F0.13 as example 1,this display default values is 10.0, flicker bit is stopped at the 1th unit.

(2) Press ▶▶ button setup do not display decimal and it's 0010, the first place of LED decimal point lights and the flicker bit is stopped at the fourth place of LED.

(3) Press ▲ button to make the LED display 1010.

(4) Press ▶▶ button twice the flicker bit is stopped at the second place of LED.

(5) Press ▼ button to make the LED display 1000.

(6) Press ▶▶ button twice to make the flicker bit stop at the first place of LED.

(7) Press ▲ button five times to make the LED display 000.5. At this time, the value of F0.10 is 1000.5s.

(8) Press SET button, save F0.13 value and display next function code automatically(F0.14).

(9) Press PRG button and exit the programming status.

Second class: The default does not display decimal number(4 LED display 5 bit integer), press ▶▶ button can hide the unit,display the highest order(million place).

Eg:The F3.03 is set to 12345,step as follows:

(1) The method of enter into the setup of F3.03 as example 1,this display default values is 1400.

(2)Press ▶▶ button twice the flicker bit is stopped at the fourth place of LED(Note:At this time, original the unit do not show, the first LED of the corresponding value is ten place,the second LED of the corresponding value is hundred place,the third LED of the corresponding value is thousand place,the fourth LED of the corresponding value is million place.To show the distinction between state, the first LED display the decimal point.),setting to 1，followed by the ▶▶ button to jump to the third LED bit (thousand place)and set to 2,the second LED bit(hundred place) is set to 3,and the first LED bit(ten place) is set to 4.Then press ▶▶ button,it display the unit of numerical value(Note:the decimal point of first LED do not display),set to 5.

(8) Press SET button, save F3.03 value and display next function codeF3.04 automatically.

(9) Press PRG button and exit the programming status.

Notes:

(1)In the shutdown state, it can set most parameters of inverter, and in the running state, only some parameters can be modified. Specific please see Chapter V, Function Parameters.

(2)When a fault occurs, the user can perform fault query, the current fault displayed by flashing mode, but users cannot modify the code content display.

(3) To the parameters can be modified online, after display code, user can modify parameters in the setting range of parameters. But to the parameters which can not be modified online, it is invalid to press ▲ and ▼ button.

3.5 Monitoring parameters and fault recording

DD-Monitoring Parameter Group and Fault Recording					
Function Code	**Name**	**Setting Range**	**Min Unit**	**Factory Setting**	**Modification**
d-00	Output frequency	0.00-2000.0Hz	1.0Hz	0.0	◆
d-01	Set frequency	0.00-2000.0Hz	1.0HZ	0.0	◆
d-02	Output voltage	0~999V	1V	0	◆
d-03	Bus voltage(V)	0-999V	1V	0	◆
d-04	Output current	0.0-6553.5A	0.1A	0.0	◆
d-05	Motor speed (RPM/min)	0-60000RPM	1RPM	0.0	◆
d-06	Inverter operation status	0-FFFFH BIT0: running /stop BIT1: forward/reverse rotation	1	0000	

◆

		BIT2: crawl BIT3: DC brake reserved BIT4:Energy consumption braking in acceleration BIT5: over voltage limitation BIT6: Constant speed frequency BIT 7: over-current limitation In pre – excitation BIT8-9 running state:00-0 speed running/01-acceleration/10-Deceleration/11-constant speed In motor parameter tuning BIT 10: Overload warning BIT 11: Motor tuning BIT12-13 Command channel of running: 00-panel/01-terminal/10-communication BIT 14-15 state of bus voltage: 00-normal/01-low voltage protection/10-over voltage protection			
d-07	PID setting value (%)	0.0-100.0%	0.1%	0.0	◆
d-08	PID feedback value (%)	0.0-100.0%	0.1%	0.0	◆
d-09	Analog input AI 1(V/mA)	0.00-10.00v	0.01 v	0.00	◆
d-10	Analog input A2 1(V)	0.00-10.00v	0.01 v	0.00	◆
d-11	Analog output A01 (V/mA)	0.00-10.00v	0.01 v	0.00	◆
d-12	PWM input frequency(KHz)	0.00-100.00Hz	0.01 KHz	0.00	◆
d-13	Input terminal status	0-7FH	1	0	◆
d-14	Output terminal status	0-3H	1	0	◆
d-15	Temperature module(℃)	0.0-132.3℃	0.1 ℃	0.0	◆

d-16	Current counting value	0-65535	1	0	◆
d-17	Current timing value	0-65535S	1s	0	◆
d-18	Analog input A02 (V'mA)	0.00-10.00v	0.01 v	0	◆
d-19	Software update date(month,date)	0-1231	1	0508	◆
d-20	Software update date(year)	2010-2100	1	2013	◆
d-21	Third fault code	0-22	1	0	◆
d-22	Second fault code	0-22	1	0	◆
d-23	Current fault code	0-22	1	0	◆
d-24	State of current fault	0-FFFFH	1	0	◆
d-25	Output frequency of current fault	0.0-2000.0Hz	0.01 HZ	0.00	◆
d-26	Output current of current fault	0.0-6553.5A	0.1A	0.0	◆
d-27	Bus voltage of current fault	Bus voltage of current fault	1V	0	◆
d-28	Temperature module of current fault	0.0-132.3℃	0.1 ℃	0.0	◆

Chapter IV Parameters Table and operation methods

4.1 Function Parameters Table

0- Modifiable parameter at any status X-Non-modifiable parameters in operation status ◆-Actual inspection parameter, which cannot be modified ◇ Factory parameter, which can only be modified by the manufacturer, and prohibited by the user.

F0 Basic Operation Parameters					
Function Code	**Name**	**Setting Range**	**Min Unit**	**Factory Setting**	**Modification**
F0.00	User Passwords	0-65535 Note1: 0-9: without password protection	1	0	O
F0.01	Specification of inverter power	0.10-655.35kw	0.01 KW	Model setting	◆
F0.02	Panel software version No.	1.00-99.99	0.01	1.00	◆

F0.03	Control Method	0: V/F control + Manual torque boost mode 1:V/F control +Automatic torque boost mode 2:Magnetic flux vector control	1	1	x
F0.04	Operation Command Chanel Selection	0: Operation panel operation command channel 1: terminal operation command channel 2:Communication operation command channel	1	0	O
F0.05	Frequency given Chanel Selection	0:panel potentiometer 1: Digital given 1,panel ▲/▼button 2: Digital given 2,terminal Up/Down adjustment 3: Digital given 3 (communication setting) 4: AI1 analogy given (0-10V/0-20mA) 5:AI2 analogy given (0-10V) 6: pulse given (0-100KHz) 7: combination given	1	0	O
F0.06	Frequency source given method	LED the unit:Frequency Source A 0:panel potentiometer 1: Digital given 1,panel ▲/▼button 2: Digital given 2,terminal Up/Down adjustment 3: Digital given 3 (communication setting) 4: AI1 analogy given 5:AI2 analogy given 6: pulse given LED ten place:Frequency Source B 0: frequency source B lie idle 1: Digital given 1,panel ▲/▼button 2: Digital given 2,terminal Up/Down adjustment 3: Digital given 3 (communication setting)	1	041	O

		4: AI1 analogy given 5:AI2 analogy given 6: pulse given LED hundred place:combinational algorithm 0: A+B 1: A-B 2: A-B(Max) 3:Max of A and B 4:Min of A and B Note:only F0.05=7,this This parameter is valid			
F0.07	Digital frequency control	LED unit: power down storage 0:storing 1: not storing LED ten place: Stop keeping 0:keeping 1: not keeping LED hundred place: UP/DOWN Negative frequency regulation 0:valid 1: not valid LED thousand:reserved Note:It is valid when F0.05=1、2	0	000	o
F0.08	Operating frequency of digital set	0.0-[F0.10]	0.1Hz	10.0	o
F0.09	Max output frequency	MAX (50.00, [F0.10]) -2000.0Hz	0.01 Hz	50.00	X
F0.10	upper limiting frequency	MAX (0.1, [F0.11]) -[F0.09]	0.01 Hz	50.00	X
F0.11	lower limiting frequency	0.0-[F0.10]	0.01 Hz	0.00	X
F0.12	Operation time setting	0: forward rotation, 1: reverse rotation 2: reverse rotation prevention	1	0	o
F0.13	Acceleration time 1	0.1-3600.0s (unit choose by the thousand of [F1.00],the default is second)	0.1S	Model Setting	o
F0.14	Deceleration time 1		0.1S	Model Setting	o
F0.15	carrier frequency	0.4-4.0kw 7.0KHz 1.0-15.0KHz	0.1k	Model	o

	setting	5.5-30.0kw 5.5KHz 1.0-12.0KHz 37-132kw 4.0KHz 1.0-8.0KHz 160-630kw 2.5KHz 1.0-8.0KHz Note:only when the selection V/F control + manual torque boost mode and the dead time compensation is invalid, the upper limit of the carrier frequency can be more than 1KHz	Hz	setting	
F0.16	Button setting	LED the unit:M-FUNC button setting 0:JOG 1:forward/reverse rotation switching 2:clean up ▲/▼button frequency setting 3:Reverse operation(RUN as forward rotation) LED ten place:STOP button setting 0:terminal operation is invalid , communication operation is valid 1:terminal operation is valid , communication operation is invalid 2:both is invalid 3:both is valid LED hundred place:reserved LED thousand place:reserved	1	30	X

F1 Auxiliary Operation Parameters					
F1.00	Starting and stopping method and DC braking model	LED the unit: Starting method 0: starting frequency starting 1: Rotation speed tracking starting LED ten place: stop method 0:deceleration stop 1:free stop LED hundred place: Stopping or abnormal restart mode 0: invalid 1:starting frequency starting 2: Rotation speed tracking starting LED thousand place: Conventional	1	0000	X

		acceleration and deceleration time unit 0：second 1：minute			
F1.01	Starting frequency	0.00-50.00HZ	0.1Hz	1.0	X
F1.02	Starting frequency keeping time	0.0-10.0s	0.1s	0.0	O
F1.03	Starting DC braking current	0.0-150.0% * motor rated current	0.1%	0.0%	O
F1.04	Starting DC braking time	0.0-30.0s	0.1s	0.0	O
F1.05	Stop DC braking starting frequency	0.00-upper limiting frequency	0.0Hz	0.00	O
F1.06	Stop DC braking current	0.0-150.0% * motor rated current	0.1%	0.0%	O
F1.07	Stop DC braking time	0.0-30.0S	0.01s	0.10	X
F1.08	Stop DC braking waiting time	0.0-100.0s	0.01s	0.10	X
F1.09	Jog forward rotation operation frequency setting	0.00- upper limiting frequency	0.01 Hz	10.00	O
F1.10	Jog reverse rotation operation frequency setting	0.00- upper limiting frequency	0.01 Hz	10.00	O
F1.11	Jog acceleration time	0.1-3600.0S (unit choose by the thousand of [F1.00],the default is second)	0.1s	10.0	O
F1.12	Jog deceleration time		0.1s	10.0	O
F1.13	acceleration time 2		0.1s	10.0	O
F1.14	acceleration time 2		0.1s	10.0	O
F1.15	Hopping frequency	0.00-upper limiting frequency	0.01 Hz	0.00	O
F1.16	Hopping frequency range	0.00-10.0Hz	0.01 Hz	0.00	O
F1.17	Forward and reverse rotation	0.0-10.0s	0.1s	0.0	X

	blind spot				
F1.18	Lower frequency limit access to the processing	0: 0 frequency operation after time delaying 1:operation in lower limiting frequency 2: stop after time delaying	1	0	X
F1.19	Stop delay time when frequency is lower than lower limiting frequency	0.0-1000.0s	0.1	10.0	O
F1.20	Automatic fault reset times	0:Automatic reset invalid,1-9; 1:Unlimited, Countless times	1	0	X
F1.21	Automatic fault reset interval time	0.5-25.0s	0.1	3.0	X
F1.20	Waiting time of Re-start up after power failure	0.0-25.0s	0.1s	0.0	X

F2 Group V/F Control Parameters					
F2.00	V/F curve setting	0: Linear curve 1: Reducing torque curve 1 2: Reducing torque curve 2 3: user setting V/F curve	1	0	X
F2.01	Torque boost value	0.4-4.0kw 5.0% 5.5-30.0kw 3.5% 37-132kw 2.0%% 160-630kw 1.0% 0.0-30.0% * motor rated voltage	0.1%	Model setting	O
F2.02	Torque boost cut-off frequency	0.00-50.0Hz	0.01 Hz	50.00	X
F2.03	V/F frequency value F1	0.00 –Frequency value F2	0.01 Hz	12.5	X
F2.04	V/F frequency value V1	0.00-Frequency value V2	0.1%	25.0%	X
F2.05	V/F frequency value F2	Frequency value F1-Frequency value F3	0.01 Hz	25.00	X
F2.06	V/F frequency	Voltage value V1-voltage value V3	0.1%	50.0%	X

	value V2				
F2.07	V/F frequency value F3	Frequency value F2--motor rated frequency[F3.04]	0.01 Hz	37.50	X
F2.08	V/F frequency value V3	Voltage value V2-100.0% *motor rated voltage [F3.01]	0.1%	75.0%	X

F3 Group –Motor Parameters					
F3.00	Inverter load model	0: G model (Constant torque load model) 1: P model (Fan and pump load model)	1	0	X
F3.01	Motor rated voltage	380V:0-500V 220V:0-250V	1V	380 220	X
F3.02	Motor rated current	0.1-3000.0A	0.1A	Model Setting	X
F3.03	Motor rated speed	0-60000RPM	1RPM	Model Setting	
F3.04	Motor rated frequency	1.0-2000.0Hz	0.1Hz	50.0Hz	X
F3.05	no-load current of asynchronous machine	0.1-[F3.02]	0.1A	Model Setting	X
F3.06	Stator resistance of asynchronous machine	0.001-20.000Ω	0.001Ω	Model Setting	X
F3.07	Motor Tuning Selection	0: No action 1: static tuning (Measurement of stator resistance) 2:Complete tuning (Measurement of stator resistance and no-load current)	1	0	X

P4 Group ---Performance optimization parameters					
F4.00	AVR function	0: invalid 1: valid for whole process 2:only invalid for deceleration	1	2	X
F4.01	PWM model	The unit of LED: blind spot selection 0: invalid 1: valid Ten place of LED: over modulation	1	1001	X

		selection 0: invalid 1: valid Hundred place of LED: Carrier mode selection 0: PWM model 1(routine) 1: PWM model 2(7 segments with full frequency) Thousand place of LED: Low carrier mode adjust 0: invalid 1: valid			
F4.02	Acceleration current limitation coefficient	0: close 1-255	1	10	X
F4.03	Constant speed current limitation coefficient	0: close 1-255	1	0	X
F4.04	Deceleration voltage limitation coefficient	0: close 1-255	1	10	X
F4.05	slip frequency compensation	0.0-200.0% * rated slip frequency (It is default as 100.0% under advanced VF control mode.)	1%	0.0%/100.0%	O
F4.06	slip compensation filtering coefficient	0-255	1	Model setting	O
F4.07	Over torque detection motion selection	0: detection invalid 1:continuous operation after detecting over-torque in constant speed 2: cut off output after detecting over-torque in constant speed 3: continuous operation after detecting under-torque in constant speed or acceleration 7: cut off output after detecting over -torque in constant speed or acceleration	1	0	X

F4.08	Over torque detection value	0-200%	1%	150%	X
F4.09	Over torque detection time	0.0-10.0 s	0.1s	0.0	X
F5 Group Digital Quantity Input and Output Parameters					
F5.00	Input terminal X1 function	0:Control terminal idling 1: multi-segment speed selection S1 2: multi-segment speed selection S2 3: multi-segment speed selection S3 4:Acceleration and deceleration time selection 5: Acceleration and deceleration prohibition command 6: running command switching to terminal 7: running command switching to communication 8 :running command channel selection S1 9: running command channel selection S2 10: Forward jogging control 11: Reverse jogging control 12: Forward control (FWD) 13: Reverse control (REV) 14: 3-line type running control 15: Free stop control 16:Stop DC brake control 17: External stop signal input (STOP) 18: External reset signal input (RST) 19: External equipment fault normal on input 20: frequency increasing instruction (UP) 21: frequency decreasing instruction(DOWN) 22: Up/Down terminal frequency zero clearing 23: Frequency source switching to AI2 terminal 24: pulse frequency input (only valid for X5) 25:counter zero cleaning signal	1	12	X
F5.01	Input terminal X2 function		1	13	X
F5.02	Input terminal X3 function		1	17	X
F5.03	Input terminal X4 function		1	18	X
F5.04	Input terminal X5 function		1	24	X
F5.05	Expansion terminal X6 function Note:Need hardware support		1	0	X
F5.06	Expansion terminal X7 function Note:Need hardware support		1	0	X

		26:counter triggering signal 27: Timing zero clearing signal 28: timing triggering clearing signal			
F5.07	FWD/REV terminal control mode	0: 2-line control mode 1 1: 2-line control mode 2 2: 3-line control mode 1 3: 3-line control mode 2	1	0	X
F5.08	Terminal function detection selection when powering on	0: terminal running command is invalid when powering on. 1: terminal running command is valid when powering on.	1	0	
F5.09	UP/DOWN terminal frequency modification speed	0.1-99.9Hz/s	0.01 HZ/s	1.00	O
F5.10	Digital input terminal filtering times	1-10	1	2	O
F5.11	Open collector output terminal Y1 setting	0:indication operation of inverter 1:indication in 0 rotation speed operation of inverter 2: inverter running is ready 3:Frequency /speed arrival signal(FAR) 4:Frequency/speed level detection signal (FDT) 5:External default stopping 6:output frequency is up to upper limit. 7: Output frequency is up to lower limit. 8:inverter default 9: simple PLC running segment number complete indication 10:running period of simple PLC segment is completed 11: timer overflow signal 12:Counter detection signal	1	0	O
F5.12	Open collector output terminal Y2 setting		1	0	O

		13:Counter reset signal 14:over-load alarming signal of inverter 15:Over-torque indication 16:auxiliary motor			
F5.11	Y1/R1 close delay	0.0-260.0s	0.1	0.0	X
F5.12	Y2/R2 open delay	0.0-260.0s	0.1	0.0	X
F5.13	Frequency is up to FAR detection width	0.0-15.0Hz	0.1Hz	5.0	O
F5.14	FDT1 level setting	0.0Hz-[F0.10]	0.1Hz	10.0	O
F5.15	FDT1 lagged value	0.0-30Hz	0.1Hz	1.0	O

F6 Group –Analog Quantity and Pulse Input and Output Parameters					
F6.00	AI1 input lower limit voltage	0.00-[F6.01]	0.01v	0.00	O
F6.01	AI1 input upper limit voltage	[F6.00]-10.00V -200.0%～200.0% Note: range and P6.00 correlation	0.01v	10.00	O
F6.02	AI1 lower limit corresponding physical value set	-100.0%-100.0%	0.1%	0.0%	O
F6.03	AI1 upper limit corresponding physical value set	-100.0%-100.0%	0.1%	100.0%	O
F6.04	AI2 input lower limit voltage	0.00-[F6.05]	0.01v	0.00	O
F6.05	AI2 input upper limit voltage	[F6.04]-10.00V	0.01v	10.00	O
F6.06	AI2 lower limit corresponding physical value set	-100.0%-100.0%	0.1%	0.0%	O
F6.07	AI2 upper limit corresponding physical value set	-100.0%-100.0%	0.1%	100.0%	O

F6.08	Lower limit of external pulse input	0.00-[F6.09]	0.01kHz	0.00	O
F6.09	Upper limiting of external pulse input	[F6.08]-100.00kHz	0.01kHz	20.00	O
F6.10	Lower limit corresponding physical value setting of external pulse	-100.0%-100.0%	0.1%	0.0%	O
F6.11	Lower limit corresponding physical value setting of external pulse	-100.0%-100.0%	0.1%	100.0%	O
F6.12	Analog potentiometer input lower limit voltage	0.00-[F6.13]	0.01V	0.20	O
F6.13	Analog potentiometer input upper limit voltage	[F6.12]-5.00V	0.01V	4.80	O
F6.14	Analog input signal filter time constant	0.1-5.0s	0.1s	0.1	O
F6.15	Analog quantity input anti-shake deviation limit	0.00V-0.10V	0.01V	0.00	O
F6.16	0 frequency running threshold	0 -50.00Hz	0.01Hz	0.00	X
F6.17	0 frequency running	0 -50.00Hz	0.01Hz	0.00	X
F6.18	A0 multi-function analog quantity output terminal function selection	LED the unit:A01 selection 0: output frequency 1: Setting frequency 2:output current	1	200	O

		3: Motor speed 4: output voltage 5: Bus voltage 6:AI1 7:AI2 8:External input pulse frequency LED ten place:reserved LED hundred place:A02 selection 0-8 Refer to the LED unit selection LED thousand place:reserved Note:when open the function of A02,must set the function of X5 of F5.04 to 0,or the system will have the default D function effectively.			
F6.19	AO1 output lower limit	0.00-[F6.20]	0.01v	0.00	O
F6.20	AO1 output upper limit	[F6.19]-10.00v	0.01v	10.00	O
F6.21	AO2 output lower limit	0.00-[F6.22]	0.01v	0.00	O
F6.22	AO2 output upper limit	[F6.21]-10.00v	0.01v	10.00	O

F7 Group – Process PID Parameters					
F7.00	PID function setting 1	LED the unit:enable control 0:invalid 1:valid LED ten place:PID polarity selection 0: positive 1: negative LED hundred place:reserved LED thousand place:Sleep downtime method 0: deceleration stop 1: free stop	1	0000	X
F7.01	PID function setting 2	LED the unit:PID given input channel 0:panel potentiometer 1:digital given 2:AI1 3:AI2 4:External pulse 5:AI1+AI2 6:AI1+AI2 7:MIN｛AI1,AI2｝	1	1000	X

		8: MAX｛AI1,AI2｝ LED ten place:PID feedback input channel 0:AI1 1: AI2 2: terminal pulse LED hundred place:reserved 0: integral control with constant ratio 1: integral control with changing proportion LED thousand place:Sleep mode 1: feedback pressure is beyond or lower than sleep threshold value, it sleeps 2: When feedback pressure and output frequency is stable, it sleeps.			
F7.02	Given digital quantity setting	0.0-100.0%	0.1%	0.0%	O
F7.03	feedback channel proportional gain	0.01-10.00	0.01	1.00	O
F7.04	Proportional gain P	0.01-5.00	0.01	1.00	O
F7.05	integration time Ti	0.0: Non integral 0.1-50.0s	0.01s	0.10	O
F7.06	derivative time Td	0.0: No differential 0.1-10.0s	0.01s	0.0	O
F7.07	Sampling cycle T	0.0: automatic 0.1-10.0s	0.01s	0.0	O
F7.08	Deviation limit	0.0-20.0%	0.1%	2.0	O
F7.09	Closed loop preset frequency	0.00- Upper limiting frequency	0.1Hz	0.0	O
F7.10	Preset frequency holding time	0.0-6000.0s	0.1s	0.0	X
F7.11	Feedback of when entering into sleep and set pressure deviation limit	0.0-20.0% Note: the function parameter is only valid for 2nd sleep mode.	0.1%	5.0	O
F7.12	Sleep threshold	0.00-10.00% Note: the function parameter is only valid for 1st sleep mode.	0.1%	10.0	O
F7.13	Wake-up threshold	0.00-100.0%	0.1%	0.0	O

F7.14	Sleep delay time	1.0-6000.0s	0.1s	100.0	O
F7.15	Wake-up delay time	1.0-6000.0s	0.1s	1.0	O

F8 Group-Programmable operation parameters					
F8.00	Programmable operation control(Simple PLC operation)	LED the unit:PLC enable control 0: invalid 1:valid LED ten place:operation method selection 0:single cycle 1:Continuous cycles 2:Maintain final value for operation after :single cycle LED hundred place:starting method 0: Re-start from 1st segment 1: Start starting from the stage of stop (fault) moment 2: Start starting from the stage and frequency of stop (fault) moment LED thousand place:power down memory 0: No memory 1: memory	.1	0000	X
F8.01	Multi-segment speed frequency 1	- Upper limit frequency–upper limiting frequency	0.1Hz	5.0	O
F8.02	Multi-segment speed frequency 2	- Upper limit frequency–upper limiting frequency	0.1Hz	10.0	O
F8.03	Multi-segment speed frequency 3	- Upper limit frequency–upper limiting frequency	0.1Hz	15.0	O
F8.04	Multi-segment speed frequency 4	- Upper limit frequency–upper limiting frequency	0.1Hz	20.0	O
F8.05	Multi-segment speed frequency 5	- Upper limit frequency–upper limiting frequency	0.1Hz	25.0	O
F8.06	Multi-segment speed frequency 6	- Upper limit frequency–upper limiting frequency	0.1Hz	37.5	O
F8.07	Multi-segment speed frequency 7	- Upper limit frequency–upper limiting frequency	0.1Hz	50.0	O
F8.08	1st segment speed running time	0.0-6000.0s	0.1s	10.0	O

F8.09	2nd segment speed running time	0.0-6000.0s	0.1s	10.0	O
F8.10	3rd segment speed running time	0.0-6000.0s	0.1s	10.0	O
F8.11	4th segment speed running time	0.0-6000.0s	0.1s	10.0	O
F8.12	5th segment speed running time	0.0-6000.0s	0.1s	10.0	O
F8.13	6th segment speed running time	0.0-6000.0s	0.1s	10.0	O
F8.14	7th segment speed running time	0.0-6000.0s	0.1s	10.0	O
F8.15	segment speed acceleration and deceleration time selection 1	LED the unit:1st segment speed acceleration and deceleration time 0-1 LED ten place:2st segment speed acceleration and deceleration time 0-1 LED hundred place: 3st segment speed acceleration and deceleration time 0-1 LED the thousand place:4st segment speed acceleration and deceleration time 0-1	0	0000	O
F8.16	segment speed acceleration and deceleration time selection 2	LED the unit:5st segment speed acceleration and deceleration time 0-1 LED ten place:6st segment speed acceleration and deceleration time 0-1 LED hundred place: 7st segment speed acceleration and deceleration time 0-1 LED the thousand place:reserved	0	0000	O

F9 Group –Protection Parameters

F9.00	protection setting	LED the unit:Motor over-load protection selection 0:invalid 1:valid LED ten place: PID feedback broken line protection 0:no action 1: Protection action and free stop 2:alarming and maintain operation in frequency at the breaking moment. 3:Alarming and take operation according to set mode and reduce to 0 speed. LED hundred place: Communication failure treatment 0: Protection action and free stop 1: Alarming and maintain current status for continuous operation 2: protection action and stop according to set stop method. LED the thousand place:Input and output lack-phase selection 0; all invalid 1: Input is valid and output is invalid 2: Input is invalid and output is valid 3: all valid	1	1001	X
F9.01	Motor over-load protection coefficient	30%-110%	0.1%	100.0%	X
F9.02	Overload pre-alarming level	120-150%	1%	120%	O
F9.03	Overload pre-alarming l delay	0.0-15.0s	0.1s	5.0	X
F9.04	Under-voltage protection level	150-280/280-480v	1v	200/380	X
F9.05	Over-voltage limitation level	350-380/660-780v	1v	380-740	X

F9.06	Current limitation level	100%-220%	1%	Model setting	X
F9.07	feedback broken line detection value	0.0-100.0%	0.1%	0.0%	X
F9.08	feedback broken line detection time	0.0-6000.0s	0.1s	10.0	X
F9.09	Output lack-phase and current unbalanced detection value	10%-100% inverter rated current	1%	50%	X
F9.10	Output current unbalanced detection coefficient	1.00-10.00 1.00: unbalance detection is invalid.	0.01	1.00	X

FA Group-Supplementary function parameters					
FA.00	dynamic braking starting voltage	340-380/660-760v	1v	360/700	O
FA.01	dynamic braking action ratio	10-100%	1%	100%	O
FA.02	Cooling fan control	0; automatic control mode 1: always running during powering on process.	1	0	O
FA.03	Energy saving control function	0-16 0:invalid	1	0	O
FA.04	Transient non-stop frequency reduction ratio	0.1-100.0Hz/s 0.0: transient non-stop function is invalid.	0.1Hz/s	0.0	X
FA.05	Speed tracking current limiting level	100%-220%	1%	Model setting	X
FA.06	Waiting time for speed tracking	0.00-100.0s	0.01s	1.00	X
FA.07	Counting and Timing model	LED the unit:Counting arrival processing. 0: Stop counting and stop output		103	X

		1: Stop counting and continue output 2: Count circularly and stop output. 3: Count circularly and continue output LED ten place:reserved LED hundred place:Timing arrival processing 0: Stop timing and stop output 1: Stop timing and continue output 2: Time circularly and stop output. 3: Time circularly and continue output			
FA.08	Counter reset value setting	[FA.09]-65535	1	1	O
FA.09	Counter detection value setting	0-[FA.08]	1	1	O
FA.10	Timing time setting	0～65535S	1s	0	O
FA.11	Running limitation function password	0-65535	110	0	O
FA.12	Running limiting function selection	0:invalid 1:valid	1	0	O
FA.13	Runnint limiting time	0-65535(h)	1h	0	O

FB Group-Communication Parameters					
FB.00	Local machine address	0-247 0: broadcast address	1	1	X
FB.01	MODBUS Communication setting	LED the unit:Protocol Selection 0:RUT 1:reserved LED ten place:Baud rate selection 0:4800BPS 1:9600BPS 2:19200BPS 3:38400BPS LED hundred place:Data format 0: without checking 1: even parity check 2:odd parity check LED thousand place: Communication response mode 0:Normal response	1	0120	X

		1:just response From the machine 2:no response			
FB.02	communication over-time detection time	0.0 (invalid), 0.1-100.0s	0.1s	10.0	X
FB.03	Local machine response delay	0-200ms	1ms	5	X
FB.04	Proportion linking coefficient	0.01-10.00	0.01	1.00	X

FC Group- Parameter Management and Display Parametets					
FC.00	Operation status monitoring parameter selection	0-20	1	0	O
FC.01	Stop status monitoring parameter selection	0-20	1	1	O
FC.02	Motor speed display coefficient	0.01-100.00	0.01	1.00	O
FC.03	Closed loop display coefficient	0.01-100.00	0.01	1.00	O
FC.04	Parameter initialization	0: No operation 1: All user's parameters(expect [F0.00] and [FA.11]- [FA.11])are reset to defaults settings 2: All user's parameters (expect [F0.00] and [FA.11]- [FA.11] and motor parameter)are reset to defaults settings 3: Clear fault records	1	0	X
FC.05	write-protect of parameter	0: write-protect closed 1: Only allow to modify frequency setting [F0.05]- [F0.11] 2: All parameters are prohibited to be modified Note: above limitations are invalid to local functional code and F0.00.	1	0	O

FF Group – Factory Parameters (FD,FE-Group Reserved)					
FF.00	Factory pass word	0-65535	1	****	◇

4.2 Detailed Description of Parameters Using

F0 Basic Operation Parameters

F.00	User Passwords	
	0-65535	0

User password setting function is a functional parameter used to prohibit unauthorized personnel reference and modification.

To avoid false operation, user password less than 10 is invalid.

When setting user password, input any figure no less than 10, press SET button to make confirmation. The password becomes effective automatically after 1 minute.

When it needs modify password, it selects 0.00 functional code and press SET button to enter into password verification status. After password verification is successful, it enters into modification status. Enter into new password and press SET button for confirmation. Password modification is successful. After 1 minutes, the password becomes effective automatically.

Make sure keep the password properly. If it is forgotten, please ask for help to the manufacturer.

The user shall keep the password properly. Please ask for help to the manufacture if it is lost.

F0.01	Specification of inverter power	
	0.10-655.35kw	Model setting
F0.02	Panel software version number	
	1.00-99.99	1.00

Above function code is used to indicate related information of inverter. It can only be checked and not be modified.

F0.03	Inverter rated power	
	0-2	0

0: V/F control + Manual torque boost mode

It refers to selected control mode when single inverter is required to drive more than 1 motors and it cannot take self-learning of motor parameters or obtain controlled motor parameters via other means. The local control mode is the most common used motor control mode. At any site with low motor control performance requirements, it can adopt such kind of control mode.

1:V/F control +Automatic torque boost mode

This is a simple flux closed loop control mode, in the condition of the power of motor is match with inverter, it can also achieve the control performance of torque which the general V/F control can not do.So when using the inverter, must insure it match with the motor,if it fail do this,must set the right motor parameter,or the inverter may not running properly.

2:Magnetic flux vector control

This kind of control mode introduces flux closed loop control idea. It can improve torque response of motor control greatly at full frequency bands, and enhance torque output capacity of motor under low frequency. Furthermore, it is not so sensitive to motor parameters as field oriented vector control. Under certain conditions with certain requirements to starting torque, (such as wire drawing machine and ball grinding mill etc), this kinds of control mode is especially applicable.

Prompt:

For the applications of multi split, does not recommend the use of automatic torque boost mode, user must be set F2.01 to the appropriate torque value. Otherwise, the inverter may not running properly.

It must set the right motor parameter under the magnetic flux vector control,and start the motor parameter tuning function to accurately measure the internal parameters of motor, it is the only way to play to the superiority of vector control.

F0.04	Running command channel selection	
	0-2	0

The function code selects inverter receiving operation and stop and other operation command physical channel.

0: Operation panel running command channel

It implements running control via 〔RUN〕、〔STOP/RESET〕、〔JOG/REV〕 and other buttons on operation panel.

1: Terminal running command channel

It implements running control via multi-functional terminal defined as FWD, REV, JOG reverse and other functions.

2: Communication running command channel

It implements running control via communication method of upper monitor.

1: Digital given 1(Panel〔▲/▼, encoder0

F0.05	Frequency given Chanel Selection	
	0-7	0

Frequency initial setting value is F0.08. Use operation panel 〔▲/▼ button or digital encoder to take adjustment. Modified frequency value will be stored in EEPROM after powering off. (If the frequency is not stored, it can be achieved via setting F0.07=x1,x=0 / 1.)

1: Digital given 2 (UP/DOWN terminal adjustment)

Frequency initial setting value is F0.18. It changes running frequency via on-off of multi-functional terminals defined as UP/DOWN function. When Up terminal is closed with COM terminal, the frequency is rising. When DOWN terminal is closed with COM terminal, the terminal is decreased. When UP/Down terminals are on off with COM terminal simultaneously, the frequency is maintained unchanged. If set frequency is stored at power off, modified frequency is stored in EEPROM after powering off.

3: Digital given 3 (communication setting)

It modifies set frequency via serial port frequency setting command. See RS485 group

communication parameters.

4: AI1 Analog given (0-10V/0-20mA)

Frequency setting is confirmed via AI1 terminal analogy voltage /current. Input range: DC 0-10V/0-20mA. More detail see F6.00-F6.03.

5: AI2 analog given (0-10V)

Frequency setting is confirmed by AI2 terminal analogy voltage /current. Input range: 0-10V.More detail see F6.04-F6.07.

6: Pulse given(0-100KHz)

Frequency setting is confirmed by pulse frequency. (It can only be input by X5.) Input pulse signal specification: high level range 15-30W; frequency range 0-100.0KHz. More detail see F6.08-F6.11.

7:given combination

F0.06	Frequency source combination	
	000-466	011

LED the unit:Frequency Source A

0:panel potentiometer

1: Digital given 1,panel ▲/▼button

2: Digital given 2,terminal Up/Down adjustment

3: Digital given 3 (communication setting)

4: AI1 analogy given

5:AI2 analogy given

6: pulse given

LED ten place:Frequency Source B

0: frequency source B lie idle

1: Digital given 1,panel ▲/▼button

2: Digital given 2,terminal Up/Down adjustment

3: Digital given 3 (communication setting)

4: AI1 analogy given

5:AI2 analogy given

6: pulse given

LED hundred place:combinational algorithm

0: A+B

Frequency source A add B ,it is taken as final given operation frequency of inverter.

1: A-B

Frequency source A subtract B ,it is taken as final given operation frequency of inverter,if the vaule is negative, it is mean reverse operation.

2: A-B(Max)

The given absolute value of frequency source A and B after subtraction is the inverter operation

frequency.

3:Max of A and B

The max given value of frequency source A and B is the operation frequency of inverter.

4:Min of A and B

The min given value of frequency source A and B is the operation frequency of inverter.

Prompt:

Select the given frequency combination, PID given, PLC given and multi speed given all can composite with frequency source A and B by priority.Priority from high to low order is: PID control - simple PLC- multi speed -- the frequency of the source F0.05 selection. The highest priority is PID control, frequency source F0.05 is the lowest priority.

F0.07	Digital frequency control	
	000-111	000

LED unit: power down storage

0:storing

When the inverter is powering on, panel and terminal frequency increment is initialized as EEPROM saved value at last power down.

1: not storing

When the inverter is powering on, panel and terminal frequency increment is initialized as 0.

Ten place of LED: stop keeping

0: stop keeping

When the inverter is stopped, frequency set value is final modified value.

1: not keeping

When the inverter is stopped, frequency set value is recovered to F0.08.

Hundred place of LED: UP/DOWN negative frequency adjustment

0: invalid

1: valid

When the selection is valid, the operation keyboard ▲/▼ button, terminal UP/DOWN may achieve positive and negative adjustment of frequency.

F0.08	Operating frequency of digital set	
	0.0-[F0.10]	50.0

When frequency channel is defined as digital given , the functional parameter is panel digital frequency given initial set frequency of inverter. Regulated quantity of operation keyboard ▲/▼ button is based on this function,after stopping and power down,the final value is decided by F0.07 whether saving in EEPROM.

When frequency channel is defined as digital given , the functional parameter is panel digital frequency given initial set frequency of inverter. Regulated quantity of turminal UP/DOWN is based on this function,after stopping and power down,the final value is decided by F0.07 whether

saving in EEPROM.

F0.09	Max output frequency	
	MAX (50.00 [P0.10])-2000.0Hz	50.00
F0.10	Upper limiting frequency	
	MAX (0.1,[F0.11])-[F0.09]	50.0
F0.11	Lower limiting frequency	
	0.0 - [F0.10]	0.0

Max output frequency is allowed output max frequency of inverter. It is the reference for acceleration and deceleration time setting, as fmax in the following figure. Basic operation frequency is corresponding mini frequency when inverter outputs max voltage. Generally, it is the rated frequency of motor, as fb in the following figure. Max output voltage Vmax is corresponding output voltage when the inverter outputs baxis operation frequency. Generally, it is rated voltage of motor, as Vmax in the following figure. fH and fL ate defined as upper limiting frequency and lower limiting frequency respectively, as Fig F1-1.

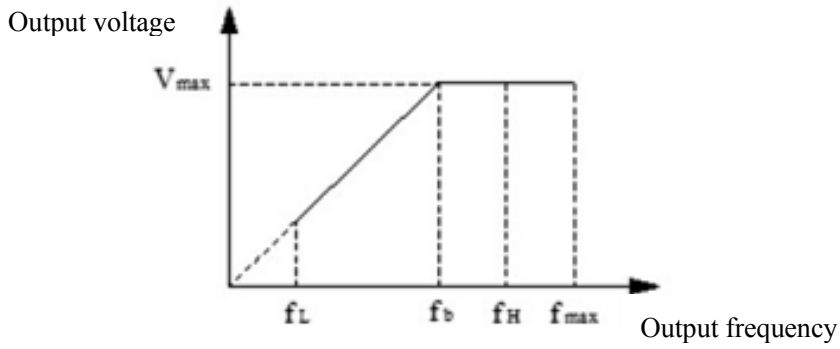


Fig F1-1 Schematic Diagram of Voltage and Frequency

F0.12	Running direction setting	
	0-2	0

0: Forward

When the mode is selected, the actual output phase sequences of inverter are consistent with system default phase sequences.

1: Reverse control

When the mode is selected, the actual output phase sequences of inverter are reverse with system default phase sequences. At the moment, RUN and FWD terminal functions on the panel are reverse control.

2: reverse prevention

At any condition, the motor can only take forward running. The function is applicable when reverse running may bring danger or assets damages. The inverter runs in 0 speeds when reverse command is given.

Prompt:

The function code setting is valid to all running direction control of running command channels.

F0.13	Acceleration time 1	
	0.1 -3600.0s	Model setting
F0.14	Deceleration time 1	
	0.1 -3600.0s	Model setting

Acceleration time refers to required time of inverter from 0 frequency acceleration to max output frequency, as in t1 in the following figure. Deceleration time refers to required time of inverter from max output frequency deceleration to 0 frequencies, as in t2 in the following figure.

Acceleration and deceleration time parameters of this series of inverter have 2 groups. Another groups acceleration and deceleration time are defined in Functional codes F1.13-F1.14.Factory default acceleration and deceleration time are 10s, if other acceleration and deceleration time groups are selected, please select via multi-functional terminals. (Please refer to functional codesF5) Acceleration and deceleration time in jog operation is defined independently in F1.11,F1.12.

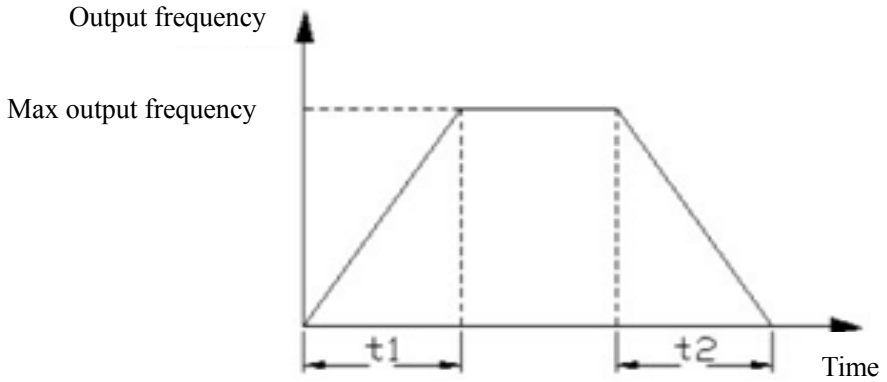


Fig F1-2 Schematic Diagram of Acceleration Time and Deceleration Time

F0.15	Carrier frequency setting	
	1.0-15.0KHz	Model setting

Power （KW）	Carrier (KHz)	Frequency (KHz)
0.4-4.0	7.0	1.0-15.0
5.5-30	5.5	1.0-12.0
37-132	4.0	1.0-8.0
160-630	2.5	1.0-8.0

Prompt:

The upper limit of carrier is 12.0KHz when meet any condition as follows:

1.Choosing Magnetic flux vector control or Automatic torque boost mode.

2.Blind spot compensation is valid.

F0.16	Button setting	
	00-33	30

LED the unit: JOG-REV button selection

0: JOG (jog control)

JOG-REV button is jogging control.

1:Forward and reverse rotation switching

Under operation status JOG-REV button is equivalent to direction switching button. The button is invalid under stop status. The switching is only valid to panel running command channel.

2: clear ▲/▼ button set frequency.

Clear the increment of frequency on keyboard,see F0.05.

3.Reverse rotation control

This time JOG-REV button can directly as reverse rotation button to control reverse rotation operation of motor.

LED ten place:STOP/RESET button function selection

0:Terminal control is invalid,only valid to communication control

Only when F0.04=2, the button is invalid, Under communication control running mode, the button can control the stop of inverter.

2:Invalid to all control modes

Only when F0.04=0 , the button can control the stop of inverter. Under communication control running mode, this button is invalid.

3: Valid to all control modes

Under any running command channel mode, the button can control the stop of inverter.

F1 Auxiliary Operation Parameters

F1.00	Starting and stopping method and DC braking model	
	0000-1211	0000

LED the unit: Starting method

0: starting frequency starting

1: Rotation speed tracking starting

When the inverter running,it will start at instantaneous frequency and the running direction of last stop after through the waiting time of rotation speed tracking starting.

LED ten place: stopping method

0: Deceleration stop

After inverter receives stop command, output frequency is reduced according to deceleration time, and it is stopped after the frequency is reduced to 0. If the stop DC braking function is valid, it will execute DC braking process after stop DC braking starting frequency is achieved, and then it is stopped.

1: Free stop

After inverter receives stop command, it terminates output immediately. Load is taken free stop according to mechanical inertia.

LED hundred place: Stopping or abnormal restart mode

0: invalid

Power on after power off,inverter will not run automatically.

1:starting frequency starting

Power on after power off. If it satisfies the starting conditions, after the inverter waits for FA.05 defined time, the inverter will be started and run automatically in frequency starting method.

2: Rotation speed tracking starting

Power on after power off. If it satisfies the starting conditions, after the inverter waits for FA.05 defined time, the inverter will be started and run automatically in speed tracking method.

LED thousand place: Conventional acceleration and deceleration time unit

0：second

This item is selected,the unit of F0.13,F0.14 and F1.14 is second.

1：minute

This item is selected,the unit of F0.13,F0.14 and F1.14 is minute.

F1.01	Starting frequency	
	0.00-50.00 Hz	1.0
F1.02	Starting frequency holding time	
	0.0-10.0s	0.0

Starting frequency refers to initial frequency when the inverter is started, as in fs in the following figure. For certain system with larger starting torque, reasonable starting frequency setting can overcome starting difficulty problem effectively. Starting frequency holding time refers to the time that maintains operation during starting process and under starting frequency, as in t1 in the following figure. Starting frequency schematic diagram is as the following:

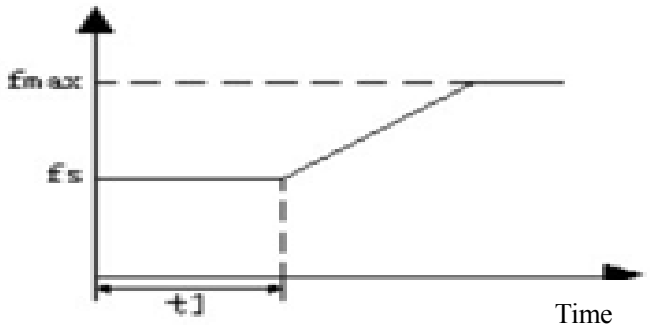


Fig 1-1 Schematic Diagram of Starting Frequency 90

F1.03	Starting DC braking current	
	0.0-150.0%	0.0%
F1.04	Starting DC braking time	
	0.0-30.0s	0.0

Starting DC braking current setting refers to the percentage to inverter rated output current,the range is 0.0-150.0%.

When starting DC braking time is 0.0s, it does not have DC braking process. See following figure on details.

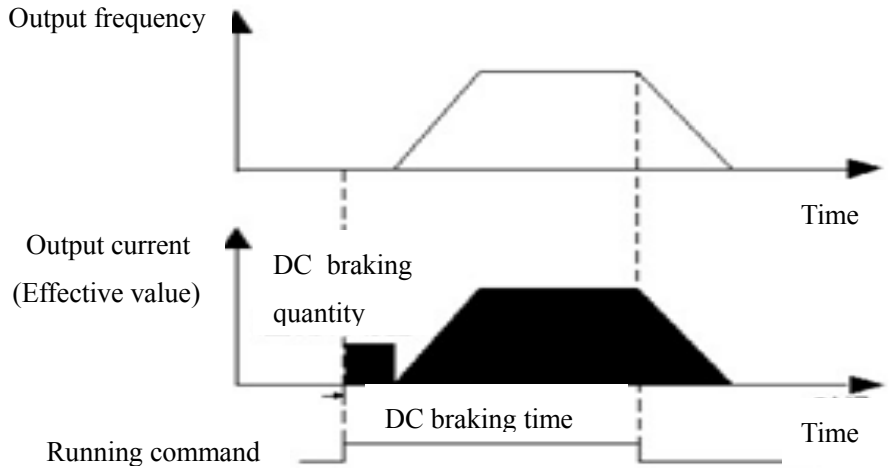


Fig 1-2 Schematic Diagram of Starting DC Braking

F1.05	Stop DC braking starting frequency	
	0.00-upper limiting frequency	0.0
F1.06	Stop DC braking current/voltage	
	0.0-150.0%	0.0%
F1.07	Stop DC braking time	
	0.0-30.0s	0.0
F1.08	Stop DC braking waiting time	
	0.00-100.00s	0.10

Setting value of stop DC braking current refers to percentage relative to inverter rated output current,and the setting range is 0.0-150.0%. When starting DC braking time is 0.0s, it does not have DC braking process. See following figure on details.

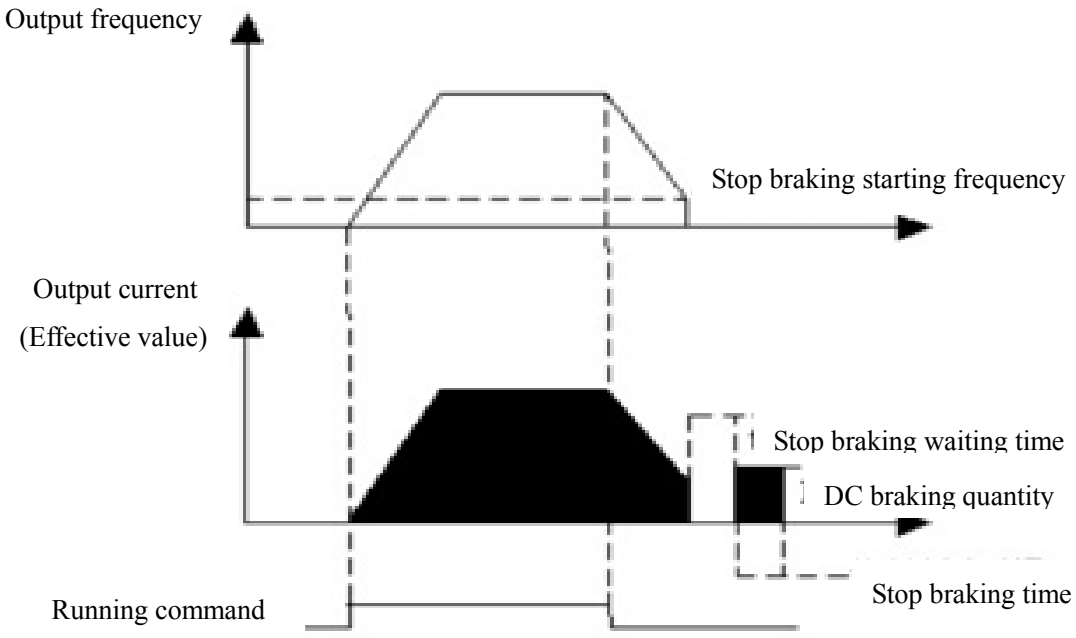


Fig 1-3 Schematic Diagram of Stop DC Braking

F1.09	Jog forward rotation operation frequency setting	
	0.00-upper limiting frequency	10.0
F1.10	Jog reverse rotation operation frequency setting	
	0.00- upper limiting frequency	10.0
F1.11	Jog acceleration time setting	
	0.1-3600.0s	10.0
F1.12	Jog deceleration time setting	
	0.1-3600.0s	10.0

F1.09--F1.12 define related parameters in job running, as in Fig P1-4. T1 and t3 are jog acceleration and deceleration of actual running, t2 is jogging time; t4 is jogging interval time (F1.17); f1 is forward jogging running frequency (F1.09); f2 is reverse jog running frequency (F1.10). Actual running jog acceleration time t1 is confirmed according to the following formula:

t1=F1.09*F0.10/F0.09

Similarly, jog deceleration time t3 of actual running t3 can also be confirmed in the following way:

t3=F1.10*F0.11/F0.09

In which F0.09 is max output frequency.

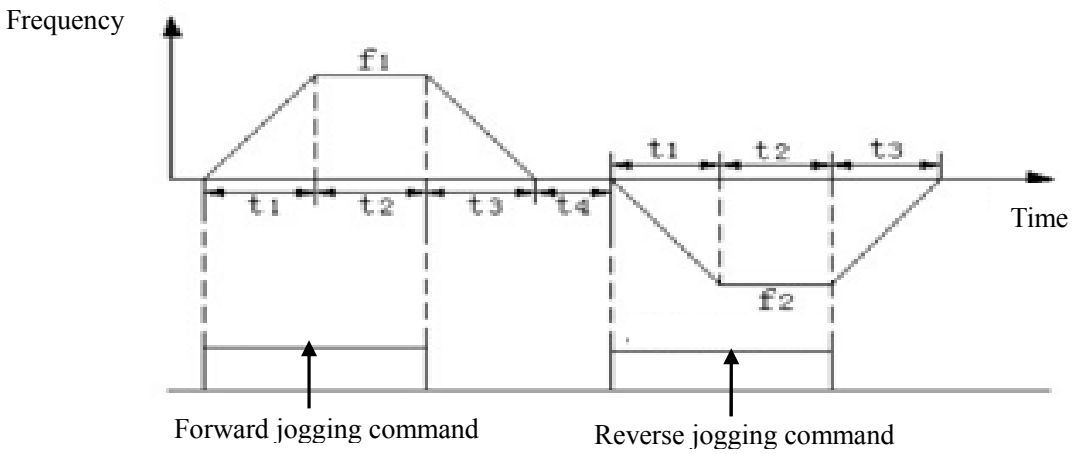


Fig 1-4 Jog Running Drawing

F1.15	Jump frequency 1	
	0.00-upper limiting frequency	0.00
F1.16	Jump frequency 1 range	
	0.00-10.0Hz	0.00

Above functional code is to make the output frequency of inverter avoid the resonance frequency of the mechanical load. Set frequency of inverter is given in jump type near certain frequency point according to the following method in figure. Its specific meaning is the frequency of inverter always runs stably in the jump frequency range, but it may pass the range in acceleration and

deceleration process.

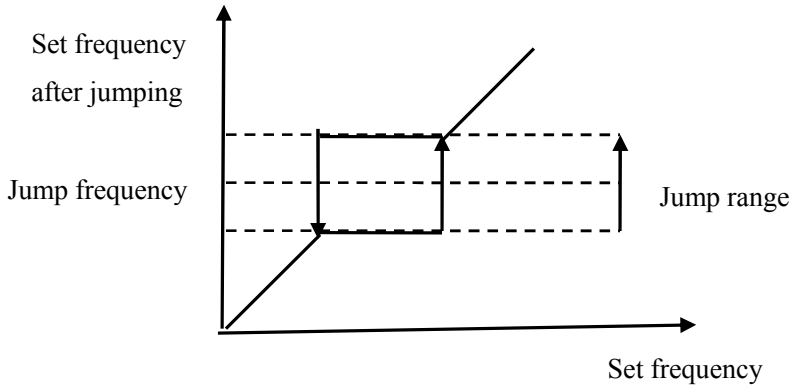


Fig 1-5 Schematic Diagram of Jump Frequency

F1.17	Forward and reverse rotation blind spot	
	0.0-10.0s	0.0

Waiting time that the inverter is transited from forward direction to reverse direction or from reverse rotation to forward rotation is as t1 in the following Fig.

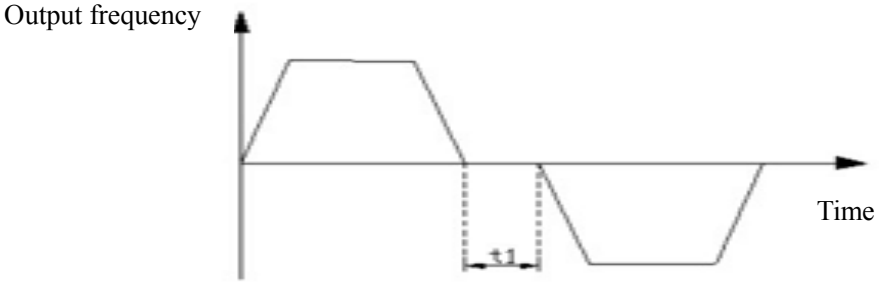


Fig 1-6Schematic Diagram of Forward and Reverse Blond Spot Time

F1.18	Processing when setting frequency is lower than lower limiting frequency	
	0-2	0

0 frequency operation after time delaying

When the set frequency is lower than lower limiting frequency set value (F0.11), the inverter is operated in 0 frequency after delay time (F1.19).

1: operation in lower limiting frequency

When the set frequency is lower than lower limiting frequency set value (F0.11), the inverter is operated in lower limiting frequency.

2: stop after time delaying

When the set frequency is lower than lower limiting frequency set value (F0.11), the inverter is stopped after delay time (F0.19).

F1.19	Stop delay time when frequency is lower than lower limiting frequency	
	0.0-3600.0s	10.0

See F1.18 parameter description.

F1.20	Automatic fault reset times	
	0-10,0:it means invalid,10: it means the times are unlimited	0
F1.21	Automatic fault reset interval time	
	0.5-25.0s	3.0

After the fault is appeared in the running process, the inverter stops output, and displays fault code. After F1.21 set reset interval, the inverter resets the fault automatically and restarts operation according to the set starting method.

Automatic fault reset times are determined by F1.20. When the fault reset times are set as 0, there is no automatic reset function, and it can only take manual reset.

It can define 4 kinds of acceleration time, and select acceleration and deceleration time during inverter running process via different combination of control terminals.

F1.21	Waiting time of Re-start up after power failure	
	0.0-25.0S	0.0

In the waiting time of re-starting, it is invalid when inputting any running instruction. If stop instruction is input, the inverter will release speed tracking restarting status automatically and back to the stop status.

Notes

1: The parameter may cause unexpected motor starting. It may bring potential injury to the equipments and personnel. Make sure to use it carefully.

F2 V/F Control Parameters

F2.00	V/F curve setting	
	0-3	0

This group of functional codes have defined V/F curve setting method of motor to satisfy different load characteristics requirements. According to P5.00 definition, it can select 5 kinds of fixed curves and a kind of user-defined curve.

0: Linear curve

Linear curve is suitable to common constant torque load, and output voltage is in linear relation with output frequency.

1: Reducing torque curve 1 (1.5 power)

In reducing torque curve1, output voltage is in 1.5 power relation with output frequency, as in curve 1 in Fig F2-1.

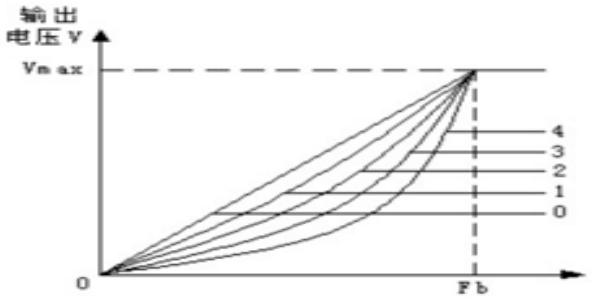
2: Reducing torque curve 1 (2.0 power)

In reducing torque curve1, output voltage is in 2.0 power relation with output frequency, as in

curve 2 in Fig F2-1.

3: user setting V/F curve (determined by F2.01-F2.06)

When F2.00 is selected as 5, the user can customize V/F curve via F2.01-F2.06. It adopts (V1, F1), (V2, F2), (V3, F3) increasing, and original point and max frequency point broken line method are used to define V/F curve to be adaptable to special load characteristics, as in Fig 2-1.



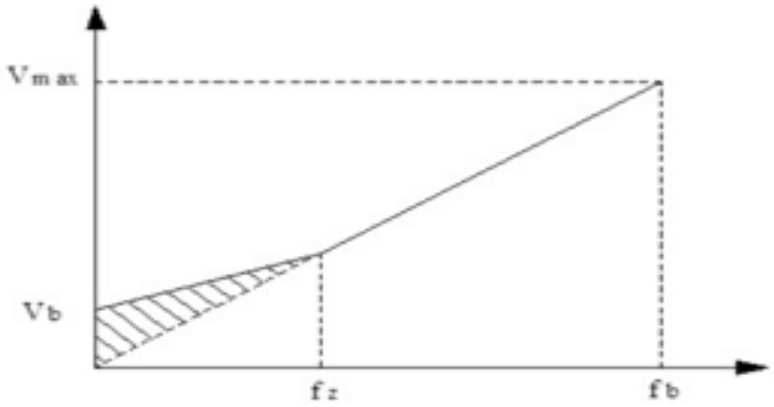
Vmax: Max output voltage

Fb: Max output frequency

Fig F2-1 Schematic Diagram of V/F Curve

F2.01	Torque boost setting	
	0.0-30.0% * motor rated voltage	Model setting
F2.02	Torque boost cut-off frequency	
	0.00-motor rated frequency	50.00

To compensate low frequency torque characteristics, it can make certain boost compensation to output voltage. The functional code is set as automatic boost in 0.0%. It is manual torque boost method if any one quantity is set other than 0.0%. F2.02 has defined boost cut-off frequency in manual torque boost, as in Fig F2-2.



Vb-manual torque boost quantity Fig F2-2

F2.03	V/F frequency value F1	
	0.00 –Frequency value F2	12.5

F2.04	V/F voltage value V1	
	0.00-voltage value V2	25.0%
F2.05	V/F frequency value F2	
	Frequency value F1-Frequency value F3	25.0
F2.06	V/F voltage value V2	
	Voltage value V1-voltage value V3	50.0%
F2.07	V/F frequency value F3	
	Frequency value F3- motor rated frequency(F3.04)	37.5
F2.08	V/F voltage value V3	
	Voltage value V3-100.0% * motor rated voltage(F3.01)	75.0%

Schematic diagram of voltage and frequency is as the following:

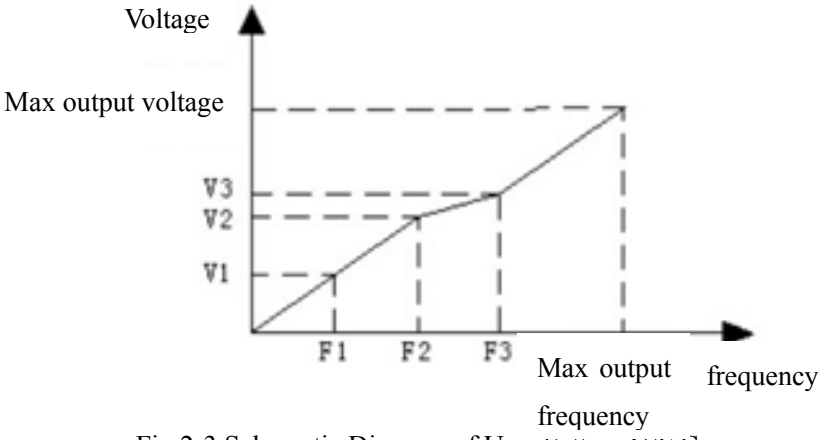


Fig 2-3 Schematic Diagram of User Setting V/F Curve

F3 Motor Parameters

F3.00	Inverter load model	
	0-1	0

0: G model (constant torque load model)

1: P model (fan, water pump type load model)

In the inverters, G/P models will be processed with integration, i.e. lower 1 gear power of G model can be used as higher 1 gear power of P model. However, the prerequisite is the local functional code must be set as corresponding value.

After the parameter is set to 1,the rated current of motor will be higher 1 gear power automatically to insure the inverter is match with motor.So do not set the motor parameter again.

F3.01	Motor rated voltage	
	0-250V	220
	0-500V	380
F3.02	Motor rated current	
	0.1-3000.0A	model setting
F3.03	Motor rated speed	
	0-60000RPM	model setting
F3.04	Motor rated frequency	
	1.0-2000.0Hz	50.0Hz

F3.05	no-load current of motor	
	0.1-(F3.02)	model setting

When the motor is under the rated voltage and frequency,the current of on-load is the rated excitation current of the motor.

F3.03	Stator resistance of motor	
	0.001-20.000Ω	model setting

Phase resistance of motor stator side.

F3.06	Motor parameter Tuning	
	0-2	0

0: No action

1: static tuning

It is parameter measuring mode of motor under static status. This mode is applicable to site that motor cannot be separated with load.

2: complete tuning

It is complete parameter measuring mode of motor.

Before starting motor parameter tuning, it shall ensure the motor is in stop status. Otherwise, the tuning cannot be taken normally.

In some cases that it is inconvenient to take complete tuning or user has low motor control performance requirements (such as motor cannot be separated with load), it can take static tuning.

F4 Performance optimization parameters

F4.00	AVR function	
	0-2	2

0: invalid

1: valid for whole process

2: Invalid only in speed reduction

AVR is voltage adjustment function. When the inverter input voltage and rated value have deviation, it can maintain the output voltage of inverter constant through the function to prevent the motor is in over-voltage status. When the output instruction voltage is larger than the input power voltage, the function is invalid. During the speed reduction process, if AVR is no actuated, the deceleration time is short, but the running current is larger. If the AVR is actuated, the motor deceleration is stable and the running current is smaller, but the deceleration time is longer.

F4.01	PWM mode	
	0000-1111	1001

The unit of LED: blind spot selection

0: invalid

1: valid

When it selects valid, under all control methods, full frequency blind spots are compensated. The function is mainly used for factory debugging. It is not suggested to be set by the customer.

Ten place of LED: over modulation selection

Over-modulation function refers to the inverter improves increase output voltage through adjusting the bus voltage utilization ration. When the over-modulation is valid, the output harmonic wave will be increased. If it is in low voltage and heavy load for a long period or high frequency (more than 50Hz) running torque is insufficient, it can use the function.

0: invalid

1: valid

Hundred place of LED: Carrier mode selection

0: PWM model 1(routine)

Current output is stable, high frequency power tube has lower heat radiation.

1: PWM model 2(7 segments with full frequency)

Current output is stable and full frequency power tube has higher heat radiation.

Thousand place of LED: Low carrier mode adjust

0: invalid

1: valid

This function can reduce the motor frequency torque ripple, improve the operation stability.

F4.02	Acceleration voltage limitation coefficient	
	0-255	10

This parameter is used to adjust the inverter capacity of inhibition of over-current during acceleration, if it is 0, the larger the value is, the stronger the over voltage suppression capability is.

For small load inertia, this value should be smaller, otherwise cause the slow dynamic response. For large load inertia, this value should be large, otherwise the suppression effect is not good, may appear over-current fault.

F4.03	Constant speed voltage limitation coefficient	
	0-255	0

This parameter is used to adjust the inverter capacity of inhibition of over-current during constant speed , if it is 0, close the function.the larger the value is, the stronger the over voltage suppression capability is.

F4.04	Deceleration voltage limitation coefficient	
	0-255	10

This parameter is used to adjust the inverter capacity of inhibition of over-current during deceleration, if it is 0, close the function. the larger the value is, the stronger the over voltage suppression capability is.

For small load inertia, this value should be smaller, otherwise cause the slow dynamic response. For large load inertia, this value should be large, otherwise the suppression effect is not good, may appear over-voltage fault.

Prompt:

There parameter F4.02-F4.04 is used to improve the acceleration and deceleration performance, for applications with the high requires of acceleration and deceleration need to adjust parameters of F 9.05-F9.06 together.

F4.05	Slip frequency compensation	
	0.0-200.0%	0.0%/100%

Asynchronous motor with load may cause reduction of speed. Slip compensation enables the motor speed approach synchronous speed, thus makes the motor speed control has higher accuracy. Under vector V/F control mode, it is default as 100.0% rated slip.

This function code is mainly used in speed reduction of motor after load , reasonable set it can effectively improve the motor speed control accuracy. 100% the amount of compensation is equivalent to the motor rated slip frequency.

F4.06	Slip compensation filtering coefficient	
	0-255	5

The parameter is used to adjust slip frequency to compensate response speed. The larger the set value is, the slower the responding speed is, and the more stable the motor speed is.

F4.07	Over torque detection motion	
	0-4	0
F4.08	Over torque detection value	
	0.0%-200.0%	150%
F4.09	Over torque detection time	
	0.0-10.0S	0.0

When the actual torque is in F4.09 (over torque detection time) and larger than F4.08(over torque

detection value) continuously, the inverter do corresponding action according to F4.07 settings. Torque detection level setting values is corresponding motor rated torque in 100%.

0: detection invalid

It does not take torque detection.

1: continuous operation after detecting over-torque in constant speed

It only detects whether it is over-torque in constant operation speed, and the inverter continues operation after over-torque is detected.

2:cut off output after detecting over-torque in constant speed

It only detects whether it is over-torque in constant operation speed, and the inverter stops output after over-torque is detected and the motor is stopped by free sliding.

3: continuous operation after detecting over-torque in constant speed or acceleration.

The inverter continues operation after over-torque is detected in constant speed or acceleration.

4: cut off output after detecting over-torque in constant speed or acceleration

The inverter stops output after over-torque is detected in constant speed or acceleration and the motor is stopped by free sliding.

F5 Digital Quantity Input and Output Parameters

F5.00	Input terminal X1 function	
	0-31	12
F5.01	Input terminal X2 function	
	0-31	13
F5.02	Input terminal X3 function	
	0-31	17
F5.03	Input terminal X4 function	
	0-31	18
F5.04	Input terminal X5 function	
	0-31	24
F5.05	Input terminal X6 function	
	0-31	0
F5.06	Input terminal X7 function	
	0-31	0

Multi function input terminal of the X1-7 function is very rich, can according to needs choose conveniently, can define the function of X1-X7 respectively through set the value of F5.00-F5.06,while the function of X6 and X7 need hardware support.

0: Control terminal idling

1: multi-segment speed selection 1

2: multi-segment speed selection 2

3: multi-segment speed selection 3

It can select max 7 segments speed via selecting ON/OFF combination of these functional

terminals. Detailed information is as the following:

Multi-segment Speed Selection S3	Multi-segment Speed Selection S2	Multi-segment Speed Selection S1	Segment speed
OFF	OFF	OFF	0
OFF	OFF	ON	1
OFF	ON	OFF	2
OFF	ON	ON	3
ON	OFF	OFF	4
ON	OFF	ON	5
ON	ON	OFF	6
ON	ON	ON	7

4: Acceleration time selection

This terminal is valid,select acceleration 2/deceleration 2; otherwise select acceleration 1 / deceleration 1.

5: acceleration and deceleration prohibition command

When the terminal is valid, the inverter is not affected by external signal and maintains current running.

6: running command switching to terminal

When the terminal is valid, running command is converted into terminal control from current channel forcedly. It will be back to previous running command channel when disconnecting the terminal.

7: running command switching to communication

When the terminal is valid, running command is converted into communication control from current channel forcedly. It will be back to previous running command channel when disconnecting the terminal.

8: running command channel selection 1

9: running command channel selection 2

It can select max 3 kinds of running command channels via selecting ON/OFF combination of these functional terminals. Detailed information is as the following:

Running command channel selection terminal 2	Running command channel selection terminal 2 1	Running command channel
OFF	OFF	Determined by Function code F0.04
OFF	ON	0:operation panel running command channel

ON	OFF	1: Terminal running command channel
0N	ON	2:communication running command channel

10: Forward jogging control

Terminal is connected shortly with COM, and inverter takes forward jogging. It is valid only when F0.04=1.

11: Reverse jogging control

Terminal is connected shortly with COM, and inverter takes reverse jogging. It is valid only when F0.04=1

12: Forward running (FWD)

Terminal is connected shortly with COM, and inverter takes forward running. It is valid only when F0.04=1.

13: Reverse running (REV)

Terminal is connected shortly with COM, and inverter takes reverse running. It is valid only when F0.04=1.

14: 3-line type running control

See function description of F5.07 running mode 2, 3 (3-line control mode 1,2) .

15: Free stop control

Terminal is connected shortly with COM,the inverter free stop.

16:Stop DC brake control command

Using the terminal to implement DC brake of motor in stop processing , realize emergency stop and precise positioning of motor.Starting braking, the braking current frequency is defined in F1.05-F1.06, the maximum braking time defined in the F1.07 time and the control terminal effective duration.

17: External stop signal input (STOP)

Terminal is connected shortly with COM,the inverter stop at stop method(F1.00).

18: External reset signal input (RST)

When the inverter appears fault, through the terminal, it can reset the fault. Its function is consistent with STOP/RESET button function. This function is valid at any command channel.

19: External equipment fault input

It can input malfunction signal of external equipments through the terminal, so that it is convenient to take fault monitoring to external equipments. After the inverter received fault signal of external equipments, it displays E-EF.

20: frequency increasing instruction(UP)

The terminal is connected shortly with COM and the frequency is increased. It is valid only when the frequency given change is digital given 2(terminal UP/DOWN regulation).

21: frequency decreasing instruction(DOWN)

The terminal is connected shortly with COM and the frequency is decreased. It is valid only when the frequency given change is digital given 2(terminal UP/DOWN regulation).

22: Up/Down terminal frequency zero clearing

It takes zero clearing operation through terminal to terminal regulated frequency.

23:Frequency switching to AI1

The terminal is connected shortly with COM,the current frequency given channel choose as AI1 given.When the terminal cut off,frequency given channel will return to the primary given value.

24: Pulse frequency input (only valid for X5)

It is pulse input interface when the main frequency channel selects pulse given. It is only valid for X5 and set with cooperation of F6.08-F6.11.

25: counter zero cleaning signal

When the terminal is connected shortly with COM, it takes zero clearing operation for internal counter. It is cooperated with No.26 function.

26: counter triggering signal

When the pulse input interface of internal counter receives a pulse, the counter’s counting value is added 1. (if the counting method is downwards , it subtracts 1.), Max frequency of counting pulse is 80Hz. See description of functional codes FA.08-FA.09.

27: Timing zero clearing

When the terminal is connected shortly with COM, it takes zero clearing operation for internal counter. It is cooperated with No.28 function.

28: timing triggering

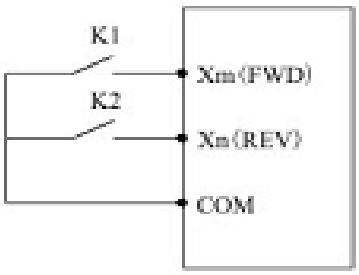
It is the trigger interface of internal timer. See detailed description of functional codes FA.10.

29-30:reserved

F5.07	FWD/REV terminal control mode	
	0-3	0

The functional code has defined 4 kinds of different methods to control inverter running through external terminals.

0: 2-line control mode 1



K2	K1	Running command
0	0	Stop
1	0	REV
0	1	FWD
1	1	Stop

Fig F5-1 Schematic Diagram of 2-line Control Mode 1

K1: Forward command (FWD), K2: Reverse command (REV). When K1 and K2 close or cut off

together ,the inverter is under stopping sates.

1: 2-line control mode 2

K2	K1	Running command
0	0	Stop
1	0	Stop
0	1	FWD
1	1	REV

Fig F5-2 Schematic Diagram of 2-line Control Mode 2

K1: running command, K2: direction control. When K1 close,the inverter running. When Trigger 1 and 2 and the inverter runs reversely,disconnect, the inverter is stopped.

2: 3-line control mode 1

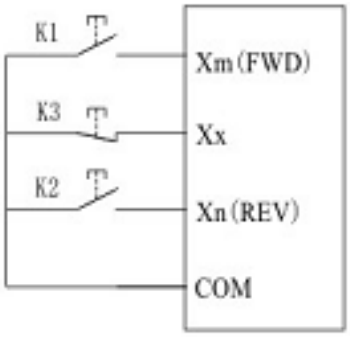


Fig F5-3 Schematic Diagram of 3-line Control Mode 1

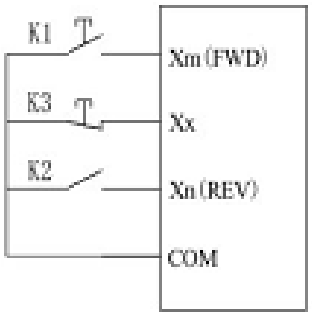
K3:Stop button

K1:Forward button

K2: Reverse button

Terminal Xx is one of multi-function of X1-X7,it should be defined as the corresponding function number 14-3-line operation control.

3: 3-line control mode 2



K2	K1	Running command
0	0	Stop
1	0	Stop
0	1	FWD
1	1	REV

Fig F5-4 Schematic Diagram of 3-line Control Mode 2

K3:Stop button

K1:Running button

K2:Direction button

Terminal Xx is one of multi-function of X1-X7,it should be defined as the corresponding function number 14-3-line operation control.

⚠Note:

It can take stable reverse running when REV terminal is defined as normally off. It is back to forward running when it is disconnected.

F5.08	Terminal function detection selection when powering on	
	0-1	0

0: terminal running command is invalid when powering on.

In the powering up process, even the inverter detects the running command terminal is valid (closed), the inverter is also not started. Only when the terminal is disconnected and re-closed, the inverter can be started.

1: terminal running command is valid when powering on.

In the powering up process, even the inverter detects the running command terminal is valid (closed), the inverter is started.

F5.09	UP/DOWN terminal frequency modification speed	
	0.1Hz-99.9Hz/s	1.0

The functional code is the frequency modification speed when UP/DOWN terminal set frequency is set, i.e. the UP/DOWN terminal is taken short circuit for 1 s with COM. The frequency changes the quantity.

F5.10	Switch quantity filtering times	
	1-10	2

It is used to set sensitivity of input terminal. If digital input terminal is easy to be interfered and cause false operation, it can increase the parameter, and the capacity of resisting disturbance is enhanced. However, it may lead to sensitivity reduction of input terminal if the set is too large.

F5.11	Open collector output terminal Y1 setting	
	0-16	0
F5.12	Open collector output terminal Y1 setting/Programmable relay R1 output	
	0-16	8

0: Inverter operation instruction

It is the output indication signal when the inverter is in running status.

1: indication in 0 rotation speed operation of inverter

The inverter output frequency is 0.00Hz, but it is still in output indication signal in running status.

2: inverter running is ready.

When the inverter powering on preparation is ready, (i.e. inverter has no fault, bus voltage is

normal, inverter prohibition running terminal is invalid, it can receive running instruction starting directly) the terminal outputs indication signals.

3: Frequency /speed arrival signal

Refer to parameter function description of F5.15.

4: Frequency/speed level detection signal (FDT1)

Refer to parameter function description of F5.16-F5.17.

5:Stop by the external equipment fault

It is the output indication signal when the inverter stop by the external equipment fault.

6: output frequency is up to upper limit.

It is the output indication signal when the inverter output frequency is up to upper limiting frequency.

7: Output frequency is up to lower limit.

It is the output indication signal when the inverter output frequency is up to lower limiting frequency.

8: fault output

It is the output indication signal when the inverter appears output.

9: programmable multi-segment running is completed.

After programmable multiple segment speed (PLC) completes current stage running, it outputs a valid pulse signal. The signal width is 500mS.

10: 1 running period of programmable multi-segment is completed.

After programmable multiple segment speed (PLC) completes one period of running, it outputs a valid pulse signal. The signal width is 500mS.

11: Timing time is achieved.

When the actual set time ≥set timing time, it outputs indication signal.

12: counter detection signal output

When counter detection value is achieved, it outputs indication signal. It is cleared until it is up to counting reset value. Refer to parameter function description of FA.09.

13: counter reset signal output

When the counter reset value is achieved, it outputs indication signal. Refer to parameter function description of FA.08.

14: over-load alarming signal of inverter

When inverter output current is beyond over-load pre-alarming level (F9.02), output indication signal after alarming delay time (F9.03) is normally used for over-load pre-alarming.

15: Over-torque indication

When the inverter is set in accordance with F4.07-F4.08, it outputs corresponding indication signal.

16:auxiliary motor

When the feedback pressure is low than setting pressure and frequency run to the upper limit,it

outputs indication signal,start auxiliary motor.while if the feedback pressure is high than setting pressure and frequency run to the lowest limit,it revoke indication signal,and shut auxiliary motor.Terminal Y2/R1 has delay timing setting,see F5.13-F5.14.

This function cooperation process PID function module can achieve simple one with three constant voltage water supply functions.

F5.11	Y2/R1 close delay	
	0.0-260.0s	0.0
F5.12	Y2/R1 disconnect delay	
	0.0-260.0s	0.0

The function codes have defined switch quantity terminal and delay from relay status appears changes to output produced changes.

F5.16	Frequency is up to FAR detection range	
	0.0Hz-15.0Hz	5.0

The function is complementation description to No.3 function of functional codes F5.11-F5.12. When the inverter output frequency is within positive and negative detected width of set frequency, the terminals output valid signal. Collector open signal, low level after pulling of resistor).

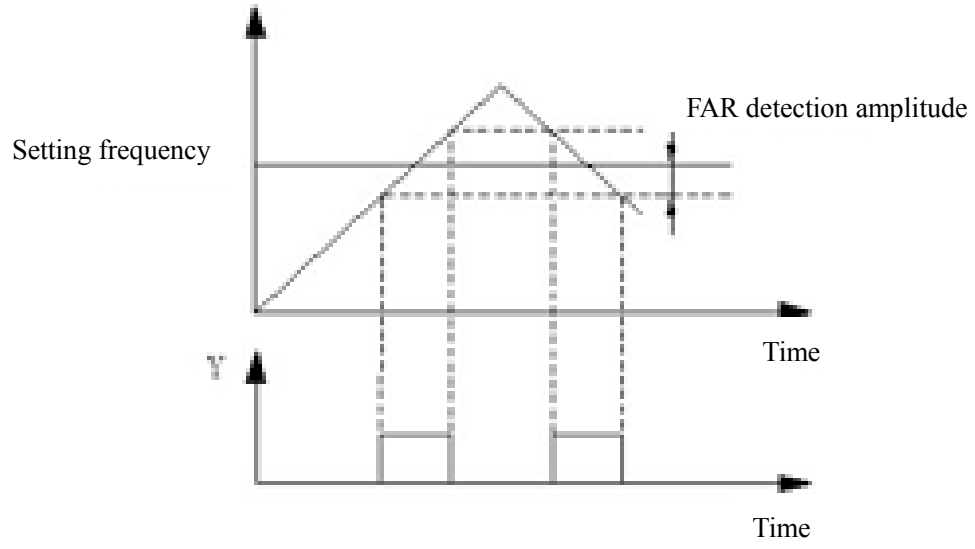


Fig F5-5 Schematic Diagram of Frequency Arrival

F5.16	FDT1 level setting	
	0.00Hz-[P0.10]	10.0
F5.17	FDT1 lagged value	
	0.0Hz-30.0Hz	1.0

The above functional codes (F5.16-F5.17) are complementation description to No.4 functions of functional codes F5.11-F5.12. When the inverter output frequency is rising and beyond the PDT level set values, it outputs valid signal. When the output frequency is lower than FDT signal (set value-lagged value), it outputs invalid signal (high-impedance state), as in the following fig.

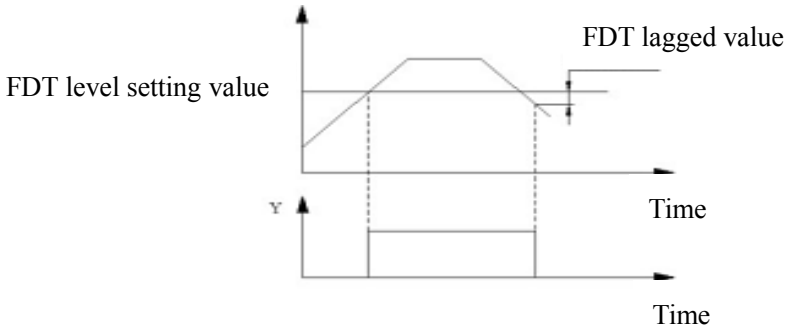


Fig F5-6 Schematic Diagram of Frequency Level Detection

F6 Group –Analog Quantity and Pulse Input and Output Parameters

2: Voltage command (output voltage, 0.0%-200.0% * motor rated voltage)

F6.00	AI1 input lower limit	
	0.00-[F6.01]	0 .00
F6.01	AI1 input upper limiting	
	[F6.00]-10.00V	10.00
F6.02	AI1 lower limit corresponding physical value set	
	-100.0%-100.0%	0.0%
F6.03	AI1 upper limit corresponding physical value set	
	-100.0%-100.0%	100 .0%
F6.04	AI2 input lower limit	
	0.00V-[F6.05]	0 .00
F6.05	AI2 input upper limit	
	[F6.04]-10.00V	10.00
F6.06	AI2 lower limit corresponding physical value set	
	-100.0%-100.0%	10 .00
F6.07	AI2 upper limit corresponding physical value set	
	-100.0%-100.0%	100.0%

The above functional codes have defined analog input voltage channel AI1, AI2 input range and their corresponding physical voltage percentage and filtering time constant. The AI2 can be selected as voltage. Current input via J1 jump. Its figure setting can be set according to 0-20mA corresponding to 0-10V. Specific setting can be defined according to actual condition of input signals.

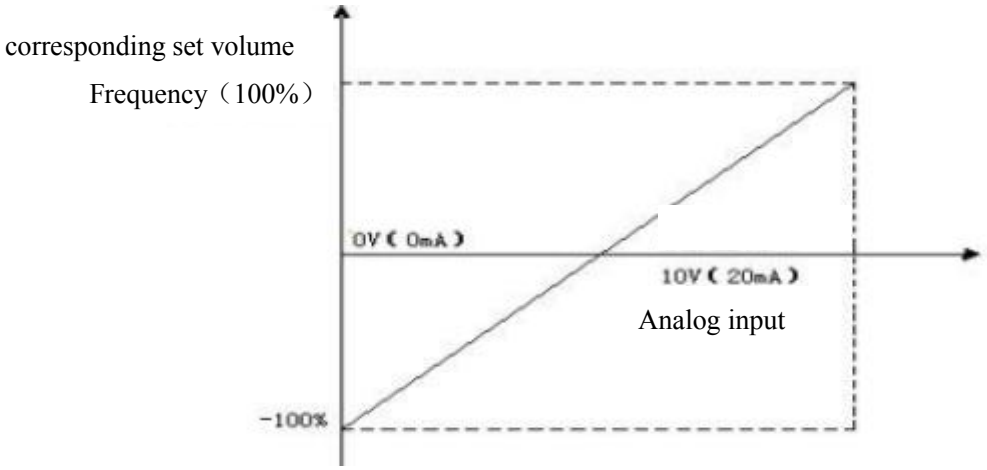


Fig F6-1 Schematic Diagram of analog input and corresponding set value frequency

F6.08	Lower limit of external pulse input	
	0.00-[F6.09]	0 .00
F6.09	Upper limiting of external pulse input	
	[F6.09]-100.0kHz	20.0
F6.10	Lower limit corresponding value setting of external pulse	
	-100.0%-100.0%	0 .0%
F6.11	Lower limit corresponding value setting of external pulse	
	-100.0%-100.0%	100.0%

Te above functional codes have input range of defined pulse input channel and their corresponding physical percentage. At the moment, multi-functional terminal X5 is defined as pulse frequency input function.

F6.12	Analog potentiometer input lower limit voltage	
	0.00-[F6.13]	0.20
F6.13	Analog potentiometer input upper limit voltage	
	[F6.12]-5.00V	4.8
F6.14	Analog input signal filter time constant	
	0.1-5.0s	0.1

Inverter input filtering time constants are mainly used to process analog input signal filtering to eliminate the effect if interference. The larger the time constant is, the stronger the capacity of resisting disturbance is, and the control is more stable. However, the response is slower. On the contrary, the smaller the constant is, the quicker the response is. However, the weaker the capacity of resisting disturbance is, and the control may not be stable. In actual application, if the optimal value cannot be determined, it shall adjust the parameter value according to whether the control is stable and response delay condition.

F6.15	Analog quantity input anti-shake deviation limit	
	0.00V-10.00V	0 .10

When analog input signal is fluctuated frequently near the given value, it can suppress the fluctuation caused frequency fluctuation through setting F6.15.

F6.09	0 frequency running threshold	
	0 .0 -50.00Hz	0.00
F6.10	0 frequency running	
	0.0-50.0Hz	0 .00

The two functional codes are used to set 1 frequency return difference control function, taking analog AI1 current given channel as example. See Fig F6-2.

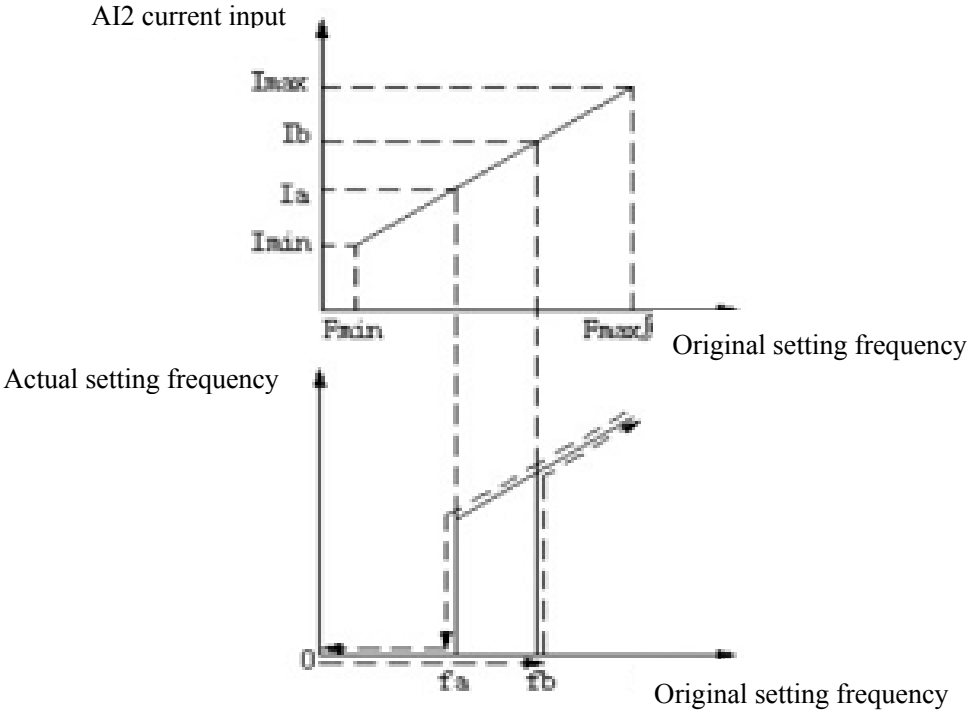
Starting process:

After the running command is issued, only when analog AI1 current input is up to or supposes certain value Ib and corresponding set frequency is up to fb, the motor can be started and accelerates to analog AI1 current input corresponding frequency according to acceleration time.

Stopping process:

During the running process, when analog AI1 value is reduced to Ib, the inverter will not stop immediately. Only when the AI1 current is reduced to Ia continuously and corresponding set frequency is fa, the inverter stops output. Here, fb is defined 0 frequency running threshold, which is defined by F6.16. fb-fa values are defined as 0 frequency return difference, which are defined by functional codes F6.17.

With this function, it can finish sleep function and achieve energy saving running. Furthermore, it can avoid frequently starting of threshold frequency through return difference width.



Fb: 0 frequency running threshold

Fa: Fb 0 frequencies return difference

Fig F6-2 Schematic Diagram of 0 Frequency Function

F6.18	A0 multi-function analog quantity input terminal function selection	
	000-808	200

he above function codes have defined multi-functional analog output terminal A0, and corresponding relations with all physical quantities. The specific information is as the following table:

0: Speed command (output frequency -100.0%-100.0%)

1: Torque command (output torque, -200.0%-200.0%)

AI1 analog given is taken as given value of torque instruction. Given torque range can be -200.0%-200.0%. Please see F6 group function description on related setting.

2: Voltage command (output voltage, 0.0%-200.0% * motor rated voltage)

2: Voltage command (output voltage, 0.0%-200.0% * motor rated voltage)

F6.04	AI2 input lower limit	
	0.00V-10.00V	0 .00
F6.05	AI2 lower limit corresponding physical value set	
	-200. 0%～200. 0%	0 .0%
F6.06	AI2 input upper limit	
	0.00V-10.00V	10 .00
F6.07	AI2 upper limit corresponding physical value set	
	-200. 0%～200. 0%	100.0%

The above functional codes have defined analog input voltage channel AI1, AI2 input range and their corresponding physical voltage percentage and filtering time constant. The AI2 can be selected as voltage. Current input via J1 jump. Its figure setting can be set according to 0-20mA corresponding to 0-10V. Specific setting can be defined according to actual condition of input signals.

AI1, AI2 input filtering time constants are mainly used to process analog input signal filtering to eliminate the effect if interference. The larger the time constant is, the stronger the capacity of resisting disturbance is, and the control is more stable. However, the response is slower. On the contrary, the smaller the constant is, the quicker the response is. However, the weaker the capacity of resisting disturbance is, and the control may not be stable. In actual application, if the optimal value cannot be determined, it shall adjust the parameter value according to whether the control is stable and response delay condition.

Item	A01	Item Range
Output frequency (compensation before slip)	0V/0mA-A0 upper limit value	0-max output frequency
	2V/4mA-A0 upper limit value	0-max output frequency
Set frequency	0V/0mA-A0 upper limit value	0-max output frequency
	2V/4mA-A0 upper limit value	0-max output frequency
Output current	0V/0mA-A0 upper limit value	0.0-2.0 times of rated current
	2V/4mA-A0 upper limit value	0.0-2.0 times of rated current
Motor speed	0V/0mA-A0 upper limit value	0-Motor synchronous speed
	2V/4mA-A0 upper limit value	0-Motor synchronous speed
Output voltage	0V/0mA-A0 upper limit value	0-max rated output voltage
	2V/4mA-A0 upper limit value	0-max rated output voltage
Bus voltage	0V/0mA-A0 upper limit value	0-1000V
	2V/4mA-A0 upper limit value	0-1000V
AI1	0V/0mA-A0 upper limit value	0.00-20.00mA
	2V/4mA-A0 upper limit value	0.00-20.00mA
AI2	0V/0mA-A0 upper limit value	0.0-10.00V
	2V/4mA-A0 upper limit value	0.0-10.00V
Output pulse frequency	0V/0mA-A0 upper limit value	0.00-100.0KHz
	2V/4mA-A0 upper limit value	0.00-100.0KHz

LED the unit:A01 selection

0: output frequency

1: Setting frequency

2:output current

3: Motor speed

4: output voltage

5: Bus voltage

6:AI1

7:AI2

8:External input pulse frequency

LED ten place:reserved

LED hundred place:A02 selection

0-8 Refer to the LED unit selection

LED thousand place:reserved

F6.16	AO1 analog output lower limit	
	0.00-[F6.20]	0.00
F6.17	AO1 analog output upper limit	
	[F6.20]-10.00V	10.00
F6.18	AO2 analog output lower limit	
	0.00-[F6.22]	0.00
F6.19	AO2 analog output upper limit	
	[F6.21]-10.00V	10.00

The above functional codes have defined analog output voltage channel A01, A02 input range,if hardware support output current,it can be selected as voltage. Current output via jump line. Its figure setting can be set according to 0-20mA corresponding to 0-10V. Specific setting can be defined according to actual condition of input signals.

F7 Process PID Parameters

Through the parameter group setting, it can form a complete analog feedback control system.

Analog feedback control system: Given quantity is used AI1 input, and converts controlled subject physical quantity into 4-20mA current through inverter AI2 input. With internal PI adjuster, it forms analog closed loop control system, as in the following Fig:

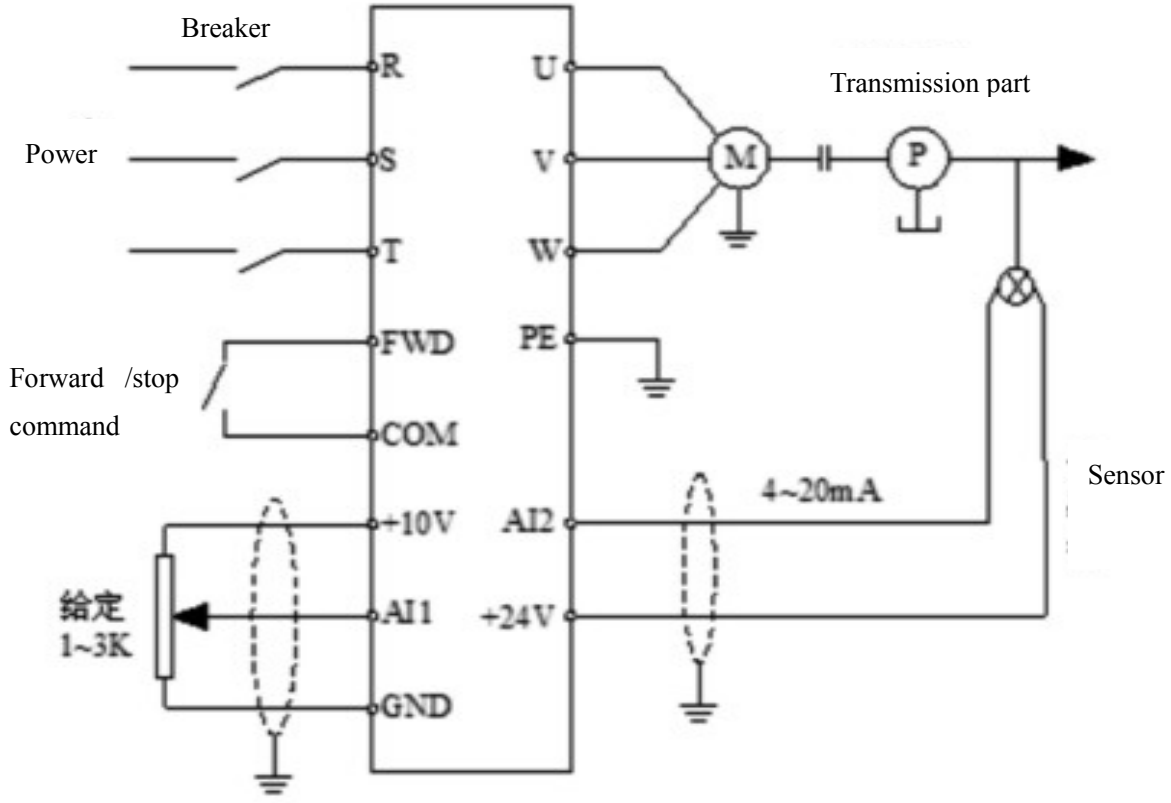


Fig F7-1 Schematic Diagram of Analog Feedback Control System

PID adjustment effects are as the following:

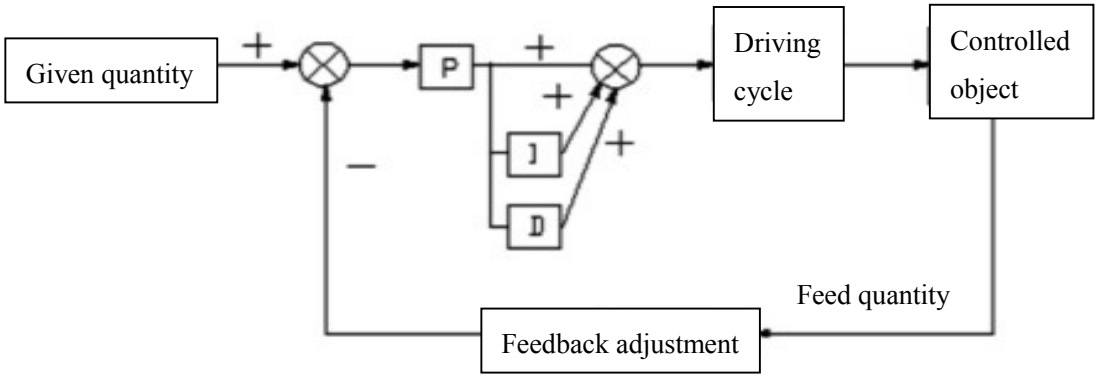


Fig F7-2 Schematic Diagram of PID Adjustment

F7.00	PID function setting 1	
	0000-1001	0000

LED the unit:enable control

0:invalid

1:valid

When this parameter is valid,it can realize PID function.

The ten place of LED: PID polarity selection

0: positive

When the feedback signal is larger than PID given quantity and it requires reduce inverter output frequency (i.e. reducing feedback signal) to make PID achieve balance, it is positive characteristics, such as rewinding tension control, constant pressure water supply control etc.

1: negative

When the feedback signal is larger than PID given quantity and it requires increasing inverter output frequency (i.e. reducing feedback signal) to make PID achieve balance, it is negative characteristics, such as rewinding tension control, central air-conditioning control etc.

LED hundred place:reserved

LED thousand place:Sleep downtime method

0: deceleration stop

1: free stop

F7.01	PID function setting 2	
	0000-1128	1000

LED the unit:PID given input channel

0:panel potentiometer

When the difference is negative, feedback value of PID is default as 0.

1:digital given

PID given quantity is given by digits and set by functional code F7.02.

2:AI1

PID given quantity is given by external analog signal AI1 (0-10V/0-20mA).

3:AI2

PID given quantity is given by external analog signal AI2 (0-10V).

4:Terminal pulse

LED ten place:PID feedback input channel

0:AI1

PID feedback quantity is given by external analog signal AI1.

1: AI2

PID feedback quantity is given by external analog signal AI2.

LED hundred place:reserved

0: integral control with constant ratio

1: integral control with changing proportion

LED thousand place:Sleep mode

1: feedback pressure is beyond or lower than sleep threshold value, it sleeps

2: When feedback pressure and output frequency is stable, it sleeps.

It has the following two conditions .

1) If the feedback value is smaller than given value and larger than *(1-setting deviation [F7.11]), changes of output frequency is within 6% range and it enters into sleep after maintaining sleep delay time [F7.14]..

2) When the feedback value rises to above given value, it enters into sleep after maintaining sleep delay time [F7.14]. On the contrary, if the feedback value is reduced to below waking threshold [F7.13], it is wakened immediately.

F7.02	Given digital quantity setting	
	0.0-100.0%	0.0

When it adopts analog quantity feedback, the functional codes have achieved using operation panel to set closed loop controlled given quantity. The function is valid only when the closed loop given channel selects digit given *F7.01).

Example: In constant voltage water supply closed loop control system, the functional code setting shall fully consider the relation between the range of remote pressure gauge and its output feedback signal, for example, the range of pressure gauge is 0-10MPa, and corresponding voltage output is 0-10V. We need 6MPa pressure, so we can set given digital quantity a 6,00V. In this way, when PID adjustment is stable, the required pressure is 6MPA.

F7.03	PID feedback channel gain	
	0.01-10.00	1.00

When feedback channel is inconsistent with setting channel,can adjust this gain of feedback channel signal by using this function.

F7.04	Proportional gain P	
	0.01-5.00	1.00
F7.05	integration time Ti	
	0.0:Non integral regulation 0.1-50.0s	0.10
F7.06	derivative time Td	
	0.0:Non derivative regulation 0.1-10.0s	0.0
F7.07	Sampling cycle T	
	0.01-10.0s	0.0

0.0: automatic

Sampling cycle is the sampling cycle to feedback quantity. It takes once regulator calculation within each sampling cycle. The larger the sampling cycle is, the slower the response is., but it has better suppression effects to interference signal. Generally, there is no necessary to take setting.

F7.08	Deviation limit	
	0.0-20.0%	2.0

Deviation limit is the ration of absolute value of system feedback quantity and given quantity deviation to given quantity. When the feedback is within deviation limit range, PID does not take regulation.

F7.09	Closed loop preset frequency	
	0.00- Upper limiting frequency	0.0
F7.11	Preset frequency holding time	
	0.0-6000.0s	0.0

The functional codes define the inverter running frequency and running time before PID input running when the PID control is valid. In certain control system, to make the controlled objects achieve preset value rapidly, the inverter outputs certain frequency value F7.09 and frequency holding time F7.10 forcedly according to the functional code setting. When the controlled object is approaching to the control target, it can input PID controller to improve response speed as in the following Fig:

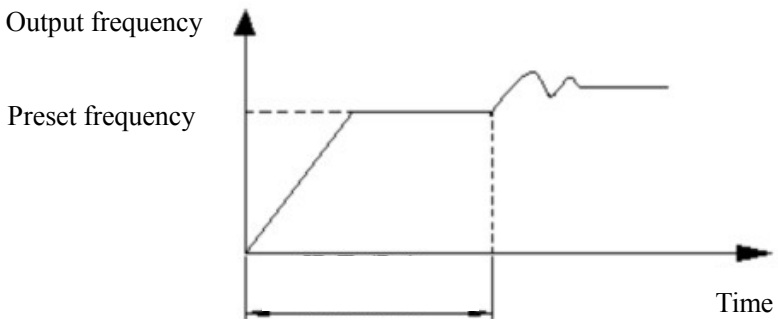


Fig F7-4 Close Loop Preset Frequency Running Schematic Diagram

F7.12	Feedback of when entering into sleep and set pressure deviation limit	
	0.0-20.0%	5.0

The function parameter is only valid for 2nd sleep mode.See function of F7.01 ten place.

F7.13	Sleep threshold	
	0.00-10.00V	10.00

The function parameter is only valid for 1st sleep mode.

F7.14	Wake-up threshold	
	0.00-10.00V	0.00

This function has defined feedback limits of inverter from sleeping status to working. If the actual feedback value is smaller than the setting value, it is separated from sleep status and starts working after the inverter passes F7.15 defined delay and other waiting time.

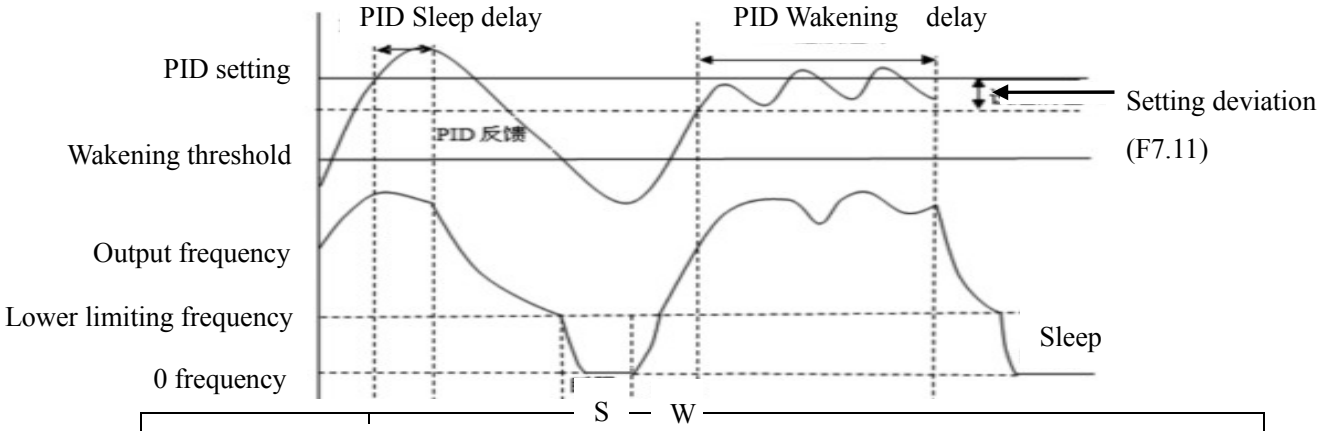


Fig F7-4 Schematic Diagram of Sleep wake function

F7.14		
	1.0- 6000.0s	100.0
F7.15	Wake-up delay time	
	1.0- 6000.0s	1.0

F8 Group-Programmable operation parameters

F8.00	Programmable operation control(Simple PLC operation)	
	0-3	0

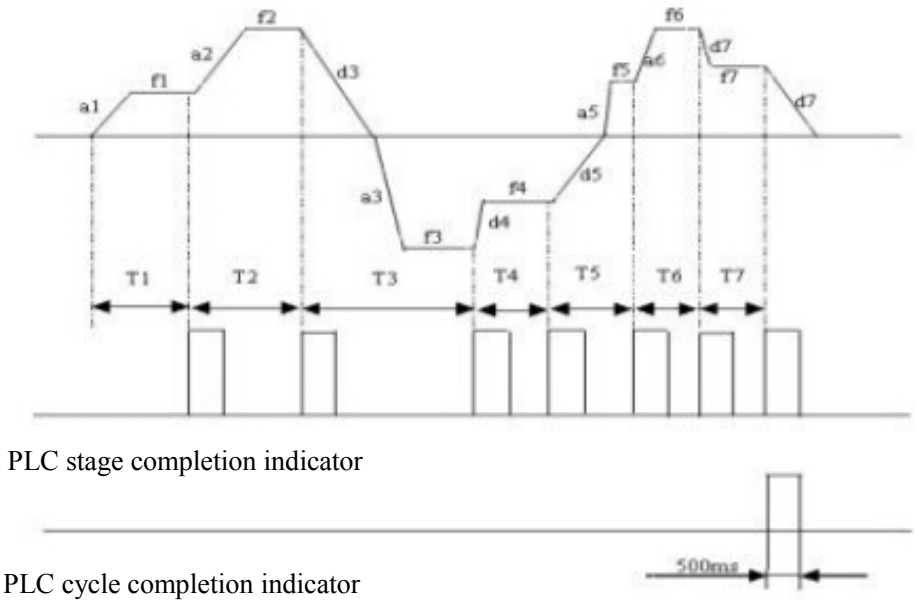


Fig F8-1 Schematic Diagram of simple PLC operation

LED the unit:PLC enable control

0: invalid

1:valid

PLC function can be realized when this parameter is valid.

LED ten place:operation method selection

0: single cycle

The inverter is stopped automatically after on single cycle. At the moment, it can be started after giving running command again. If the running time at certain stage is 0, it jumps from the local stage and enters into next stage directly, as in the following Fig.

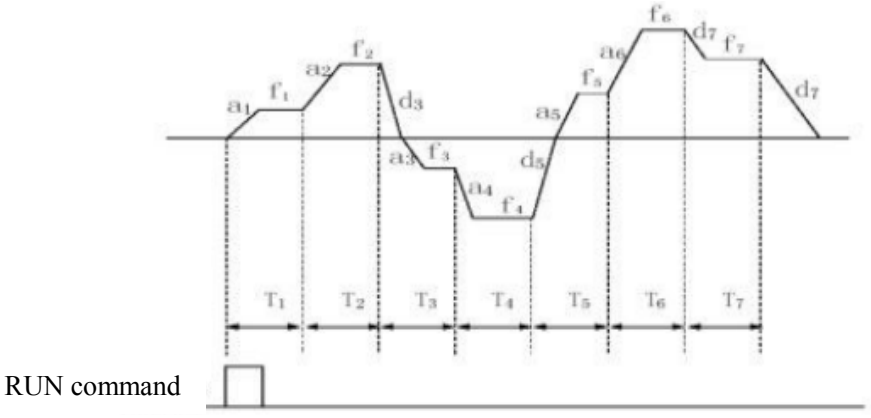


Fig F8-2 Schematic Diagram of PLC Single Cycle

1: Continuous cycles

The inverter starts taking next cycle automatically after completing one cycle. It is stopped until there is stop command, as in the following Fig.

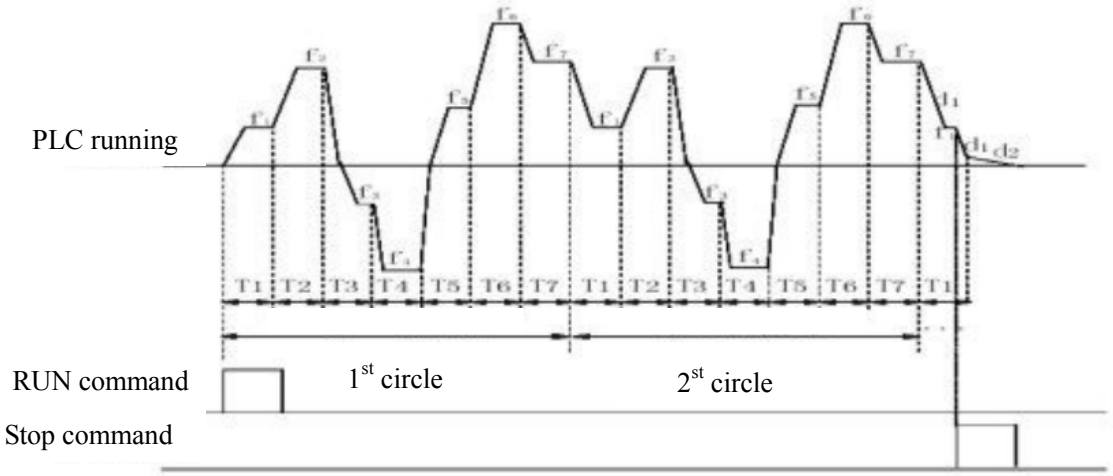
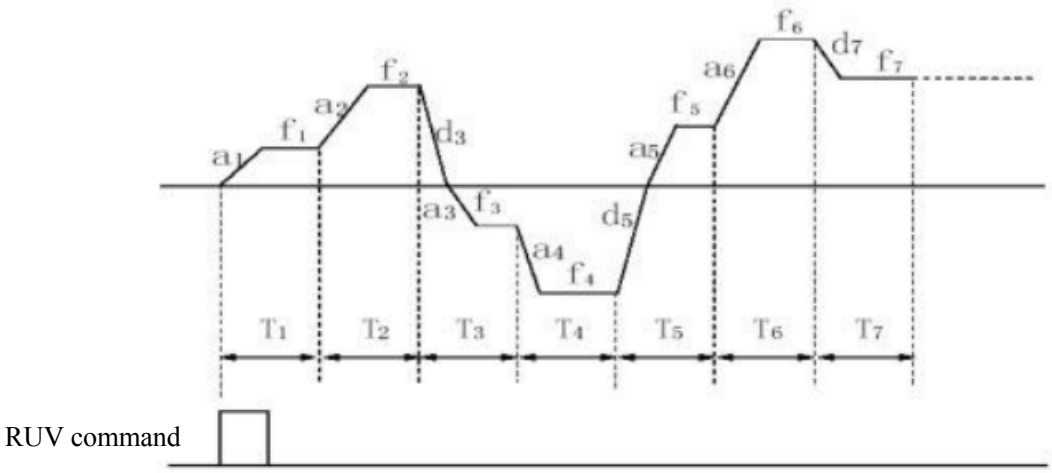


Fig F8-3 Schematic Diagram of PLC Continuous Cycles

2: Maintain final value for operation after single cycle

The inverter keeps running frequency and direction of last segment automatically keep on running after completing one single cycle, as in the following Fig.



LED hundred Fig F8-4 Schematic Diagram of simple PLC operation

0: Re-start from 1st segment

1: Start starting from the stage of stop (fault) moment

It is stopped in operation (which is caused by stop command, fault or powering down). The inverter records run time in current stage automatically. It enters into the stage automatically after re-starting.

2: Start starting from the stage and frequency of stop (fault) moment

It is stopped in operation (which is caused by stop command, fault or powering down). The inverter does not only record run time in current stage automatically, but records running frequency at the stop point.

LED thousand place:power down memory

0: No memory

It does not memorize PLC running status when powering down. It re-starts running from the 1st

segment after powering up.

1: memory

It memorizes PLC running status when powering down, including powering down time stage, running frequency, and run time. It re-starts running after powering up and enters into the stage automatically. It takes segment defined frequency and continues running of residual time.

F8.01	Multi-segment speed frequency 1	
	- Upper limit frequency–upper limiting frequency	5.0
F8.02	Multi-segment speed frequency 2	
	- Upper limit frequency–upper limiting frequency	10.0
F8.03	Multi-segment speed frequency 3	
	- Upper limit frequency–upper limiting frequency	15.0
F8.04	Multi-segment speed frequency 4	
	- Upper limit frequency–upper limiting frequency	20.0
F8.05	Multi-segment speed frequency 5	
	- Upper limit frequency–upper limiting frequency	25.0
F8.06	Multi-segment speed frequency 6	
	- Upper limit frequency–upper limiting frequency	37.0
F8.07	Multi-segment speed frequency 7	
	- Upper limit frequency–upper limiting frequency	50.0

The signs of multi-segment speed determine the running direction. Negative means reverse running direction。Frequency input method is set by F0.05 , and starting and stop commands are set by F0.04.

F8.08	1st segment speed running time	
	0.0-6000.0	10.0
F8.09	2nd segment speed running time	
	0.0-6000.0	10.0
F8.10	3rd segment speed running time	
	0.0-6000.0	10.0
F8.11	4th segment speed running time	
	0.0-6000.0	10.0
F8.12	5th segment speed running time	

	0.0-6000.0	10.0
F8.13	6^{th} segment speed running time	
	0.0-6000.0	10.0
F8.14	7^{th} segment speed running time	
	0.0-6000.0	10.0

F8.15	segment speed acceleration and deceleration time selection 1	
	0000-1111	0000

LED the unit:1st segment speed acceleration and deceleration time

0:acceleration and deceleration time 1

1:acceleration and deceleration time 2

LED ten place:2st segment speed acceleration and deceleration time

0:acceleration and deceleration time 1

1:acceleration and deceleration time 2

LED hundred place: 3st segment speed acceleration and deceleration time

0:acceleration and deceleration time 1

1:acceleration and deceleration time 2

LED the thousand place:4st segment speed acceleration and deceleration time

0:acceleration and deceleration time 1

1:acceleration and deceleration time 2

F8.16	segment speed acceleration and deceleration time selection 2	
	0000-1111	000

LED the unit:5st segment speed acceleration and deceleration time

0:acceleration and deceleration time 1

1:acceleration and deceleration time 2

LED ten place:6st segment speed acceleration and deceleration time

0:acceleration and deceleration time 1

1:acceleration and deceleration time 2

LED hundred place: 7st segment speed acceleration and deceleration time

0:acceleration and deceleration time 1

1:acceleration and deceleration time 2

LED the thousand place:reserve

F9 Group –Protection Parameters

F9.00	protection setting	
	0000-1231	1001

LED the unit:Motor over-load protection selection

0:invalid

1:valid

When function code F9.01 is valid this parameter is valid.

LED ten place: PID feedback broken line protection

0:No action

1: Protection action and free stop

2:alarming and maintain operation in frequency at the breaking moment.

3:Alarming and take operation according to set mode and reduce to 0 speed.

LED hundred place: Communication failure treatment

0: Protection action and free stop

1: Alarming and maintain current status for continuous operation

2: protection action and stop according to set stop method.

LED the thousand place:Input and output lack-phase selection

0; all invalid

1: Input is valid and output is invalid

2: Input is invalid and output is valid

3: all valid

Prompt:

1.The input losing phase protection only effective in the case of input losing phase, when DC terminal input DC power, input losing phase protection has not action.

2.When the input losing phase protection is effectively,testing standard must set reasonably, otherwise it may cause fault.

F9.01	Motor over-load protection coefficient	
	30%-110%	100.0%

To implement effective over-load protection for different types of load motors, it needs set overload protection coefficient of motor reasonably and restrict inverter allowable output max current values. Motor overload protection coefficient is the percentage of motor rated current to inverter rated output current value.

When the inverter drives power matched motor, the overload protection coefficient of motor can be set as 100%, as in the following Fig:

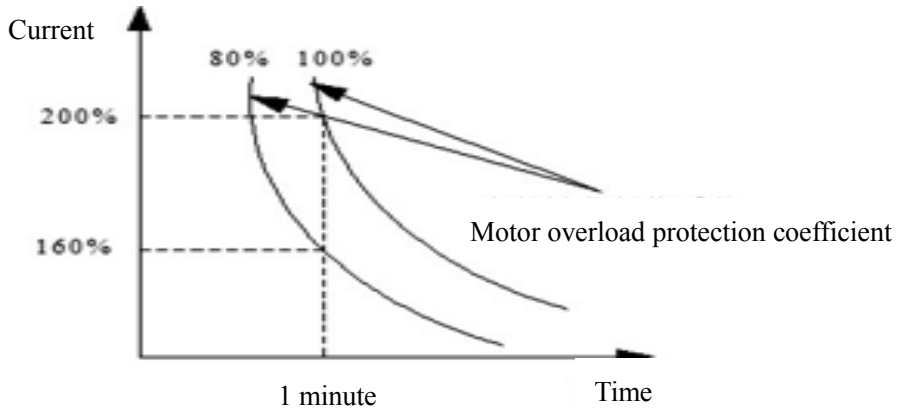


Fig F9-1 Motor Overload Protection Curve

When the inverter capacity is larger than the motor capacity, to implement effective over-load protection for different types of load motors, it needs set overload protection coefficient of motor reasonably, as in the following Fig.

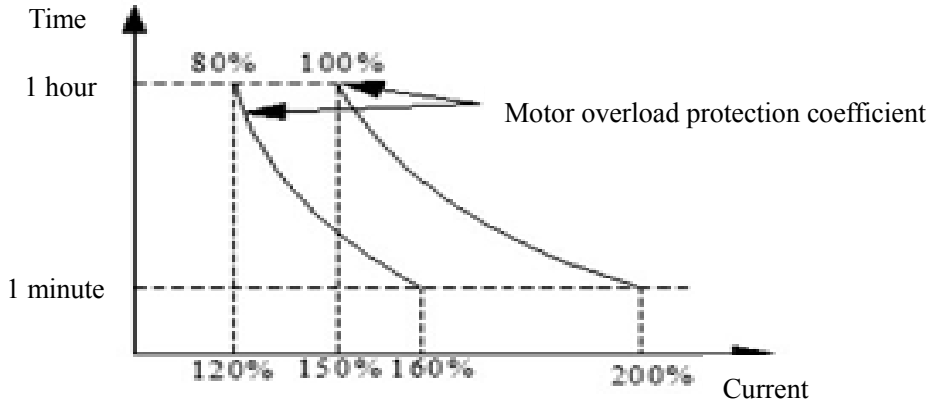


Fig F9-2 Schematic Diagram of Motor Overload Protection Coefficient Setting

Motor overload protection coefficient can be determined by the following formula:

Motor overload protection coefficient=Allowable max load current/inverter rated output current 100%.

Generally, max load current refers to rated current of negative load motor.

F9.02	Inverter overload pre-alarming level	
	120-150%	120%

Overload pre-alarming is mainly to monitor overload condition before overload protection action of inverter. Overload pre-alarming level has defined the current threshold of Overload pre-alarming action. Its setting value is the percentage relative rated current of inverter.

F9.03	Overload pre-alarming l delay	
	0.0-15.0s	5.0

Overload pre-alarming l delay has defined the delay time from the inverter output current is larger than the overload pre-alarming level amplitude (F9.02) continuously to overload pre-alarming signal output.

F9.04	Under-voltage protection level

	180-280/300-480V	200/380

The functional code has defined allowable lower limiting voltage of DC bus when the inverter is in normal operation.

F9.05	Over-voltage limitation level	
	350-380/660-760V	380/740

Over- voltage limitation level has defined the action voltage when it has voltage stalling.

F9.06	Current limitation level	
	100%-220%	Model setting

Current limitation level has defined the current threshold of automatic limitation action. Its setting value is the percentage relative to inverter rated current.

F9.07	feedback broken line detection value	
	0.0-100.0%	0.0%

Take the max value of PID given quantity as the upper limiting value of feedback broken line detection value. Within the feedback broken line detection time, when the PID feedback value is less than the feedback broken line detection value continuously, the inverter will have corresponding protection action according to F9.00 settings.

F9.08	feedback broken line detection time	
	0.1-6000.0	10.0

F9.09	Output lack-phase and current unbalanced detection value	
	10.0%-100%	50.0%

When the actual output current of motor is larger than rated current * [F9.09], the inverter appears protection action and free stop after passing F9.08 defined time if the output lack-phase protection is valid.

F9.10	Output current unbalanced detection coefficient	
	1.00-10.00	1.00

If the ratio of max value and min value in three-phase output current is larger than the coefficient, and the lasting time is more than 10s, the inverter reports output current unbalance fault EPL0, and the output current unbalance detection is invalid when F9.10=1.00.

FAGroup-Supplementary function parameters

FA.00	dynamic braking starting voltage	
	340-380/660-760V	360/700
FA.01	dynamic braking action ratio	
	10-100%	100%

The above functional codes are used to set the voltage threshold return difference value and braking utilization ratio of internal braking unit action of inverter. If the inverter internal DC voltage is higher than the energy consumption braking starting voltage, the internal braking unit is actuated. If resistor is connected at the moment, it will release the internal pump voltage energy through DC voltage to make the DC voltage fall. When the DC voltage is reduced to a certain value (starting voltage—braking return difference), the internal braking unit is closed.

FA.02	Cooling fan control	
	0-1	0

0: automatic control mode

Fan continue run in the process of running. The fan stop when the inverter stop and radiator temperature detected low than 40℃.

1: always running during powering on process

This model adapt to the site where the fan can not stop.

FA.03	Energy saving control function	
	0-16	0.0

The larger value it is set to the parameter, the energy saving efficiency is more obvious, but it may bring unstable factor for running. It is invalid when it is set as 0.

FA.04	Transient non-stop frequency reduction ratio	
	0.1-100.0Hz/s	0.0

If the inverter bus voltage is low than the 80%*rated bus voltage value(538V), according this parameter setting value,reduce frequency appropriately and through the energy feedback by overload,inverter can running in the short time;it is invalid when this value is 0.

FA.05	Speed tracking current limiting level	
	100%-220%	Model setting

In the speed tracking process, the functional code plays a role in automatic current limitation. When the actual current is up to the threshold (FA.05), the inverter reduced the frequency and limits the current. Then, it continues tracking speed. Its setting value is the percentage relative to rated current of inverter.

FA.06	Waiting time for speed tracking	
	0.00-100.00s	1.0 0

FA.07	Counting and Timing model	
	0000-0303	0

LED the unit:Counting arrival processing.

0: Stop counting and stop output

1: Stop counting and continue output

2: Count circularly and stop output.

3: Count circularly and continue output

When the counting value of counter is up to Function code FA.08 set values, the inverter executes actions correspondingly.

LED ten place:reserved

LED hundred place:Timing arrival processing

0: Stop timing and stop output

1: Stop timing and continue output

2: Time circularly and stop output.

3: Time circularly and continue output

When the counting value of counter is up to Function code FA.10 set values, the inverter executes actions correspondingly.

LED thousand place:reserved

FA.08	Counter reset value setting	
	(FA.09)-65535	1
FA.09	Counter detection value setting	
	0-(FA.08)	1

The functional codes have defined counting reset value and detection value of counter. When the counting value of counter is up to functional code FA.08 set value, corresponding multi-functional input terminals (counter reset signal output) outputs valid signals. Furthermore, it takes zero clearing to the counter.

When the counting value of counter is up to functional code FA.09 defined value, valid signal is output on corresponding ,multi-functional output terminal (counter detection signal output).

As in the following Fig: Set the programmable relay output as reset signal output, open collector output Y1 as counter detection output, FA.08 as 8 and FA.09 as 5. When the detected value is 5, Y1 outputs valid signal and maintains output continuously. The counter is taken zero cleared. Furthermore, Y1 and relays cancel output signal.

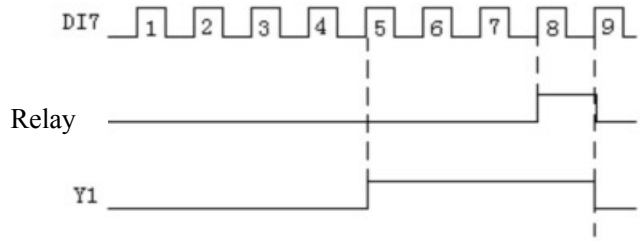


Fig FA-2 Schematic Diagram of Counter Reset Setting and Counter Detection Setting

FA.10	Timing time setting	
	0-65535s	0

This function used to define the timing time of the internal timer.

FA.11	Running limitation function password	
	0-65535	0

Under default condition, the password is 0, and it can take FA.12and FA.13 item setting. When it has password, it can only takes FA.12and FA.13 item setting after correct password verification.

When there is no need to restrict the password function, the functional code setting is 0.

When running restriction password is set, input any digits expect 0 and press SET button to confirm. The password becomes effective after 1minute.

When it needs modify the password, select FA.11functional code and press SET button to enter into password verification status. After the password verification is successful, it enters into modification status. Input new password and press SET button to make confirmation. Password modification is successful. After one minute, the password becomes effective automatically. Clear the password and running restriction password is 00000.

FA.12	Running limiting function selection	
	0-1	0

0: prohibited

1: valid

In restriction running, if the inverter accumulated running time is more than FA.13 set time, the inverter has protection action and free stop. The operation panel displays E-LT. If the fault is eliminated, verify FA.11 correctly (running restriction password) and set FA.12 (running restriction function selection) as 0 (invalid), the running restriction fault can be eliminated.

FA.13	Limiting time	
	0-65535(h)	0

See FA.12 description.

FB Group-Communication Parameters

FB.00	Local machine address	
	0-247 0:broadcast address	1

FB.01	MODBUS Communication setting	
	0000-2231	0120

LED the unit:Protocol Selection

0:RUT

1:reserved

LED ten place:Baud rate selection

0:4800BPS

1:9600BPS

2:19200BPS

3:38400BPS

The functional codes are used to define the data transmission rate between the upper monitor and

inverter. Baud rate of upper monitor and inverter setting shall be consistent. Otherwise, it cannot take communication. The larger the Baud rate setting is, the quicker the data communication is. However, too large setting may affect the stability of communication.

LED hundred place:Data format

0: without checking

1: even parity check

2:odd parity check

Data format of upper monitor and inverter setting shall be consistent.Otherwise, it cannot take communication.

LED thousand place: Communication response mode

0:Normal response

1:just response From the machine

2:no response

FB.02	RS 485 communication over-time detection time	
	0.0-100.0s	10.0

If RS485 communication is beyond the functional code defined time interval, the RS485 communication is abnormal when correct data signal is not received. When the value is set as 0.0, it does not take RS485 communication over-tome detection.

FB.03	Local machine response delay	
	0-200ms	5

The functional code has defined the intermediate time interval when the inverter data frame receiving is ended and response data frame is sent to the upper monitor. If the response time is smaller than the system processing time, the system processing time shall be prevail.

FB.04	Proportion linking coefficient	
	0.01-10.00	1.00

The functional code is used to set inverter weigh coefficient of i=received frequency from RS485 interface. The actual frequency of local machine equals to the local functional code value by RS485 received frequency set instruction value. In the linking control, the functional codes can set the ration of multiple inverters running frequencies.

FC Group- Parameter Management and Display Parametets

FC.00	Operation status monitoring parameter selection	
	0-20	0

Through changing setting values of above functional codes, it can change the monitoring items of main monitor interface. E.g.: set FC.00=2, i.e. select output current d-02, and the default display

of main monitor interface is current output value in operation.

FC.01	Stop status monitoring parameter selection	
	0-20	1

Through changing setting values of above functional codes, it can change the monitoring items of main monitor interface. E.g.: set FC.00=3, i.e. select output current d-03, and the default display of main monitor interface is voltage output value in stop.

FC.02	Motor speed display coefficient	
	0.01-10.00	1.00

The functional code is used to correct display error of speed scale. It has no influenced to actual speed.

FC.03	Closed loop display coefficient	
	0.01-10.00	1.00

The functional code is used to correct display deviation between actual physical quantity in closed loop control (pressure and flow etc) and given or feedback quantity. It has no influence to closed loop adjustment.

FC.04	Parameter initialization	
	0-3	0

0: No operation

When the inverter is in normal parameter reading and writing status, whether the setting value can be modified is related with the setting status of user's password and current working status of inverter.

1: All users' parameters are reset to defaults settings 1

Motor parameters (expect F0.00 and FA.11-FA.13) are not recovered, and the rest user's parameters are recovered to factory default values according to models.

2: All users' parameters are reset to defaults settings 2

All users' parameters (expect F0.00, FA.11-FA.13 and motor parameter group) are recovered to factory default values according to models.

3: Clear fault records

It takes zero clearing operation to fault record (D-21-D-28). After the operation is completed, the functional codes are cleared to 0 automatically.

FC.05	write-protect of parameter	
	0-2	0

0: Allow to modify all parameters (some parameters in operation cannot be modified.)

1: Only allow to modify frequency setting F0.05- F0.11.

2: All parameters are prohibited to be modified except the local functional code.

FF Group – Factory Parameters (FD,FE-Group Reserved)

FF.00	Factory pass word	
	1-65535	****

Chapter V Communication Protocol

5.1 RTU model and format

Controller as RTU mode communicate on main line of Modbus, information for each of the eight bytes is divided into two to four hexadecimal characters.Main advantage of this model is under the same baud rate the transmission character of density higher than whom ASCH had secretly mode, each information must be continuous transmission.

(1) Format of each byte in RTU model

Coding system : Eight binary hexadecimal 0-9, A-F

Data bits : 1 start bit, 8 bits of data (low to send),Stop bits for 1 bit, the parity bit can choose.(Reference RTU data frames for sequence diagrams).

Error checking area : Cyclic redundancy check (CRC)

(2) RUT data frame sequence diagram

Tape parity check

Start	1	2	3	4	5	6	7	8	Par	Stop

No parity check

Start	1	2	3	4	5	6	7	8	Stop

5.2 AMK3500 register address and function code

(1)Function code support

Function Code	Function description
03	Read a plurality of registers
06	Write a single register
10	Continuous write multiple registers

（2）Register address description:

Register Function	Address
Control command input	0×2000
Monitoring parameter reading	0×1000-0×101C
MODBUS frequency setting	0×2001
MODBUS PID feedback given	0×0000-0×0F09

(3)Reading Multiple Parameters (Max reading 8 items continuously)

Inquiryinformationframeformat(Sending frame):

Address	01H
Function	03H
Startingdataaddress	00H
	01H
Number of Data (Byte)	00H
	02H
CRCCHKHigh	95H
CRCCHKLow	CBH

Analysis of this segment of data:

01H is inverter address

03H is reading functional code.

0001H is F0.01 items of starting address similar control panel.

0002H is the item number of reading menu, and F0.01 and F0.02 items.

95CBH is 16-bit CRC verification codes.

Responseinformationframeformat(Returning frame)

Address	01H
Function	03H
DataNum*2	04H
Data1 [2Byte]	00H
	96H
Data2 [2Byte]	00H
	64H
CRCCHKHigh	**1BH**
CRCCHKLow	**F4H**

Analysis of this segment of data:

01H is inverter address

03H is reading functional code.

04H is the result of reading item *2.

0096H is the data of reading F0,01.

0064H is the data of reading F0,02.

1BF4H is 16-bit CRC verification codes.

Example:

Name	Frame Format	
Read F0.01 and F0.02 items data	Sending frame	**01H 03H 0001H 0002H 95CBH**
	Returning frame	**01H 03H 04H 0096H 0064H 1BF4H**
Read P2.01 item data	Sending frame	**01H 03H 0200H 0001H 85B2H**
	Returning frame	**01H 03H 02H 0000H B844H**
Read d-00 monitoring parameter	Sending frame	**01H 03H 0001H 0002H 95CBH**
	Returning frame	**01H 03H 02H 01F4H B853H**

(4) Writing Multiple Parameters

Inquiryinformationframeformat(Sending frame)

Address	01H
Function	06H
Startingdataaddress	20H
	00H
Data (2Byte)	00H
	01H
CRCCHKLow	43H
CRCCHKHigh	CAH

Analysis of this segment of data:

01H is inverter address

06H is writing functional code.

2000H is control command address.

0001H is forward rotation command.

43A1H is 16-bit CRC verification codes.

Responseinformationframeformat(Returning frame)

Address	01H
Function	06H
Startingdataaddress	20H
	00H
NumberofData (Byte)	00H
	01H
CRCCHKHigh	43H
CRCCHKLow	CAH

Analysis of this segment of data: If the setting is correct, it returns identical input data.

Example:

Name	Frame Format	
Forward rotation	Sending frame	**01H 06H 2000H 0001H 43CAH**
	Returning frame	**01H 06H 2000H 0001H 43CAH**
Reverse rotation	Sending frame	**01H 06H 2000H 0009H 420CH**
	Returning frame	**01H 06H 2000H 0009H 420CH**
Standby	Sending frame	**01H 06H 2000H 0009H C20BH**
	Returning frame	**01H 06H 2000H 0009H C20BH**
Free stop	Sending frame	**01H 06H 2000H 0009H 83C9H**
	Returning frame	**01H 06H 2000H 0009H 83C9H**
Reset	Sending frame	**01H 06H 2000H 0009H 43CAH**
	Returning frame	**01H 06H 2000H 0009H 43CAH**
Forward jogging	Sending frame	**01H 06H 2000H 0009H 03CBH**
	Returning frame	**01H 06H 2000H 0009H 03CBH**
Reverse jogging	Sending frame	**01H 06H 2000H 0009H 020DH**
	Returning frame	**01H 06H 2000H 0009H 020DH**
Set parameter of F8.00 item as 1.	Sending frame	**01H 06H 2000H 0009H 4A6AH**
	Returning frame	**01H 06H 2000H 0009H 4A6AH**
MODBUS given frequency is 40Hz.	Sending frame	**01H 06H 2000H 0009H D236H**
	Returning frame	**01H 06H 2000H 0009H D236H**

(5) Continuously Writing Multiple Parameters

Inquiryinformationframeformat(Sending frame)

Address	01H
Function	10H
Startingdataaddress	01H
	00H
Number of Data (Byte)	00H
	02H
DataNum*2	04H
Data1 (2Byte)	00H
	01H
Data2 (2Byte)	00H
	1EH
CRCCHKHigh	2FH
CRCCHKLow	F7H

Analysis of this segment of data:

01H is inverter address

10H is writing functional code.

0100H is P1.00 item of starting address similar control board.

0002H is register number.

04H is total bytes. (2* register number)

0001H is data of F1.00 item.

001EH is data of F1.01 item.

2FHF7H is 16-bit CRC verification codes.

Responseinformationframeformat(Returning frame)

Address	01H
Function	10H
Startingdataaddress	01H
	00H
Number of Data (Byte)	00H
	02H
CRCCHKHigh	40H
CRCCHKLow	34H

Analysis of this segment of data:

01H is inverter address

10H is writing functional code.

0100H is P1.00 item of starting address similar control board.

0002H is the item number of writing menu, and items of f1.00 and f1.01.

4034H is 16-bit CRC verification codes.

Example:

Name	Frame Format	
Set parameters of f1.00 and f1.01 as 1 and 0.02.	Sending frame	**01H 10H 0100H 0002H 04H 0001 001EH 2EF7H**
	Returning frame	**01H 10H 0100H 0002H 4034H**
Forward rotation and communication given frequency is 50Hz.	Sending frame	**01H 10H 2000H 0002H 04H 0001H 01F4H 3BB9H**
	Returning frame	**01H 10H 2000H 0002H 4A08H**
Set parameter of f1.00 item is 1.	Sending frame	**01H 10H 0100H 0001H 02H 0001H 7750H**
	Returning frame	**01H 10H 0100H 0001H 0035H**

5.3 Control command format(See example of writing functional code 06H)

Address	Bit	Meaning
2000H	Bit7-Bit5	Reserved
	Bit4	0:No action 1:Reset
	Bit 3	0:Forward rotation 1:Reverse rotation
	Bit2-Bit0	100:free stop 011:stop 010: jogging running 001:running

5.4 Address all communication parameters

Functional Codes	Communication Addresses
F0.00-F0.16	0000H-0010H
F1.00-F1.22	0100H-0116H
F2.00-F2.08	0200H-0202H
F3.00-F3.07	0300H-0307H
F4.00-F4.09	0400H-0409H
F5.00-F5.17	0500H-0511H
F6.00-F6.22	0600H-0616H
F7.00-F7.15	0700H-070FH
F8.00-F8.16	0800H-0810H
F9.00-F9.10	0900H-090AH
FA.00-FA.13	0A00H-0A0DH

FB.00-FB.04	0B00H-0B04H
FC.00-FC.05	0C00H-0C05H
FF.00-FF.09	0F00H-0F09H
d-00-d-28	1000H-101CH

5.5 Meaning of error code in response to abnormal information from the machine

Error Code	Description
01H	Illegal functional code
02H	Illegal address
03H	Illegal data
04H	Illegal register length
05H	CRC verification error
06H	Parameter cannot be modified in running.
07H	Parameter cannot be modified.
08H	Upper monitor control command is invalid.
09H	Parameter is protected by password.
0AH	Password error

Notes:

1. In above listed examples, inverter addresses are selected as 01. It is to illustrate: When the inverter is slave machine, the address is set within range of 1-247. If anyone data in the frame format is changed, the verification codes shall be re-calculated. CRC 16-bit verification codes calculation tool can be downloaded from the internet.

2. Starting address of monitoring item is 1000. Each item deviates corresponding hexadecimal value on the basis of the address. Then it is added with starting address. E.g.: the starting item is d00, and corresponding starting address is 1000H. Current read monitoring item is d-18, 18-00=18. It is 12h when 18 is converted into hexadecimal value. Then the reading address of d18 is 1000H +12H=1012H.

3. Frame format when slave machine response information appears abnormal condition: Inverter address + (80H +functional codes) +error codes +16 bit CRC verification codes; if returning frame of slave machine is 01H+83H+04H+40F3H; 01H is slave machine address; 83H is 80H +03H, it means reading error. 04H means illegal data length and 40F3H is 16-bit CRC verification codes.

Chapter VI Fault Diagnosis and Processing

6.1 Fault Inquiry

hen the inverter appears abnormal conditions, the LED Nixie light will display corresponding fault code and its contents. Fault relay is actuated, and the inverter stops output. When a fault appears, if the motor is in rotation, it will stop freely until the rotation is stopped.

This series of inverter records latest three appeared fault codes and the inverter running parameter

of last fault. Information searching is conductive to search fault causes. Fault information are all saved in d-21-d-28 groups of parameters, Please enter into d group parameters to search corresponding fault information.

Function Code	Code parts
d-21	Third fault code
d-22	Second fault code
d-23	Previous 1 fault code
d-24	Inverter sate of previous 1 fault
d-25	Output frequency of previous 1 fault
d-26	Output current of previous 1 fault
d-27	Bus voltage of previous 1 fault
d-28	Module temperature of previous 1 fault

Notes:

When the inverter appears fault, it can select one of the following operation methods to recover normal operation.

(1) When fault code is displayed, after confirming it can be reset, press

button.

(2) After setting any one terminal in X1-X7 as external RST function, the fault can be reset when the COM terminal is closed.

6.2 Fault code

Fault Code	**Fault Name**	**Possible Cases**	**Countermeasures**
E0C1	Over-current in acceleration operation	Acceleration time is too short	Prolong acceleration time.
		Restart the motor in rotation.	Set as DC braking starting.
		Inverter power is too small.	Select inverter with large power grade.
		V/F curve is improper	Adjust Torque lifting value or adjust V/F curve.
E0C2	Over-current in deceleration operation	Deceleration time is too short.	Prolong deceleration time.
		Inverter power is on low side.	Select inverter with large power grade.
		It has large inertia load.	Reduce load inertia.
E0C3	Over-current in constant speed operation	Input voltage is abnormal.	Check the input power.
		Load has sudden change or is abnormal.	Check load or reduce load sudden change.
		Inverter power is on low side.	Select inverter with large power grade.

EHU1	Over-voltage in acceleration operation	Input voltage is abnormal.	Check the input power.
		Restart the motor in rotation.	Set as DC braking starting.
		Special potential load	External braking resistor
EHU2	Over-voltage in deceleration operation	Deceleration is too long.	Prolong deceleration time.
		It has energy feedback load.	Change to use external energy consumption braking components with larger power.
		Input power is abnormal.	Check the input power.
EHU3	Over-voltage in constant speed operation	Input voltage is abnormal.	Check the input power.
		Load inertia is quite large.	Select energy consumption braking components.
EHU4	Over-voltage when shutdown	Input voltage is abnormal.	Check the power voltage
ELU0	Under-voltage of bus	Input power voltage is abnormal.	Check the input power voltage.
ESC1	Power module fault	Output 3-phase has inter-phase short-circuit or earthing short-circuit.	Re-wiring, confirm whether the insulation of motor is in good condition.
		Transient over-current of inverter.	See countermeasures on over-current.
		Airway is blocked or fan is damaged	Dredge the airway and replace the fan.
		Control board connection wire or plug-in board is loose.	Ask for service
		Auxiliary power supply is damage	Ask for service
E-OH	Overheat of heat radiator	Environment temperature is too high.	Reduce environment temperature.
		Fan is damaged.	Replace the fan
		Airway is blocked.	Clear the airway
E0L1	Over-load of inverter	Torque lifting is too high or V/F curve is improper.	Reduce torque lifting value or adjust V/F curve.
		Input voltage is abnormal.	Check the power voltage
		Acceleration time is too short.	Prolong acceleration time.

		Load is too large.	Reduce load or change inverter with larger power grade.
E0L2	Over-load of motor	Torque lifting is too high or V/F curve is improper.	Reduce torque lifting value or adjust V/F curve.
		Grid voltage is too low.	Check the grid voltage.
		Motor rotation is blocked or load sudden change is too large.	Check the load.
		Motor over-load protection coefficient setting is incorrect.	Set the motor overload protection coefficient correctly.
E-EF	External equipment fault	External fault stop terminal is valid.	Check external fault function definition of DX terminal And after external fault is cancelled, release external fault terminal.
ECPU	co processor communication fault	co processor communication is abnormal	Ask for service
EPID	PID feedback broken line	Feedback line is loose.	Check feedback line.
		Closed loop feedback value given is too small.	Adjust the feedback detection value setting.
E485	RS485 communication fault	Baud rate setting is improper.	Set proper Baud rate.
		Serial interface communication has error.	Check whether the upper monitor is working and wiring is correct
		Communication timeout	Try again
ETUN	Motor tuning fault	Motor nameplate parameter setting has error.	Set parameters correctly according to the motor nameplate.
		The inverter and the motor power specification does not match	Ask for service
		Self-tuning is over-time.	Check the motor wiring.
ECCF	Current detection error	Current detection component or the circuit is damaged	Ask for service of factory or agent.
		DC auxiliary power is	

		damaged.	
		Current detection component or the circuit appears fault.	
EEEP	EEPROM reading and writing fault	EEPROM appears fault.	Ask for service.
EPLI	Input side lack phase	Input R,S,T has lack-phase.	Check the installation wiring. And check the input voltage.
E-LT	Running limited time is achieved.	Running limit setting time is achieved.	Ask for service
EPL0	Input side lack phase or current is unbalance.	Output U,V,W has lack-phase or is abnormal.	(1) Check the output wiring.

6.3 Exception handling

Fault Name	Possible Cases	Countermeasures
Inverter over-load pre-alarming	(1)Torque lifting is too high or V/F curve is improper. (2)Grid voltage is too low. (3)Motor rotation is blocked or load sudden change is too large. (4)Motor over-load protection coefficient setting is incorrect.	(1)Reduce torque lifting value or adjust V/F curve. (2)Check the grid voltage. (3)Check the load. (4) Set the motor overload protection coefficient correctly.
RS 485 communication fault alarming	(1)Baud rate setting is improper. (2)Serial interface communication has error. (3)There is no upper monitor communication signal.	(1)Set proper Baud rate. (2) Check communication cable and ask for service. (3)Check whether the upper monitor is working and wiring is correct.
Keyboard communication fault alarming	(1) Circuit of connection keyboard and control board appear fault. (2) Terminal connection is loose.	(1)Check and re-wiring (2)Ask for service.
Motor tuning alarming		
EEPROM reading and write fault alarming	The reading and writing of control parameter appears fault.	(1) Reset STOP/RESET button, and ask for service.
PID feedback broken line	(1)Feedback lost parameter setting is improper.	(1)Modify FA.21 setting. (2)Re-wiring

alarming	(2)Feedback broken line (3)Closed loop feedback value given is too small.	(3)See setting of F8 and FA.22, and increase feedback detection value setting.

Chapter VII Application of related parameters setting

Speed tracking

Motor running free before stop, without stopping the inverter can automatically search the motor speed and when the speed of motor and inverter is same,it will accelerated speed.

Applications	Application purpose	Related parameters
Windmill, winding equipment of inertial load	The implementation of smooth starting of motor running free	F1.00、FA.05、FA.06

DC braking before running

If the direction of the free running motor is not setting,inplement the DC brake before starting.

Applications	Application purpose	Related parameters
The load of wind turbine or water pump will move when it stop.	Free running when the motor start	F1.03、F1.04

Multi stage speed

In a simple node signal, can control the seven stage operation

Applications	Application purpose	Related parameters
Transmission Machine	By a plurality of sections of the preset frequency to execute cycle operation	F5.00-F5.06、F8.01-F8.07

Multi segment acceleration and deceleration time switching operation

When a frequency inverter run more than two motors, use an external signal to switch multi segment deceleration and deceleration which functions can achieve high speed to run buffer start / stop function.

Applications	Application purpose	Related parameters
Automatic turntable of Transmission Machine	use an external signal to switch multi segment deceleration and deceleration time	F0.13、F0.14、F1.13、F1.14 F5.00-F5.06

Operating instructions

Inverter control by external terminals or control panel.

Applications	Application purpose	Related parameters
General	Choose the source of control signal	F0.01、F5.00-F5.06

Keeping frequency running

Keeping output frequency of inverter in the acceleration and deceleration.

Applications	Application purpose	Related parameters
General	Stop the acceleration and deceleration	F5.00-F5.06

Abnormal automatic restart

Inverter appear fault during operation,it will automatic reset the fault state according to the starting mode setting rerun.

Applications	Application purpose	Related parameters
Air-conditioning	Improve the operation continuity and reliability	F1.00、F1.20、F1.21、F1.22

DC braking emergency stop

The inverter not fitted with a braking resistor, can use the DC brake for motor emergency stop.

Applications	Application purpose	Related parameters
High speed shaft	Not equipped with a braking resistor, electric emergency stop.	F1.05-F1.08

Torque setting

Can set the motor or mechanical over torque value within the inverter , adjust the frequency when the output torque happened.Fit for pump wind fan machinery which is not jumping operation.

Applications	Application purpose	Related parameters
Pump,Wind fan,Compressor	Protect the operation continuity and reliability	F4.07-F4.09

Upper and lower operating frequency

When external operation signal cannot provide upper and lower limit, gain, bias, can set paraments adjustment of inverter.

Applications	Application purpose	Related parameters
Pump、Wind fan	control the speed of the motor in the band	F0.10、F0.11

Carrier frequency setting

Inverter carrier frequency can be adjusted to reduce motor noise.

Applications	Application purpose	Related parameters
General	Reduce noise	F0.15、F4.01

Signal output in operation

When motor running inverter output a signal, let go of the mechanical brake.（When inverter running free, the signal disappeared)

Applications	Application purpose	Related parameters
General: mechanical brake	Running state signal provided	F5.11- F5.12

Signal output when no speed

When the output frequency of inverter is low than the lowest output frequency,once the signal output,it must offer external system or control circuit.

Applications	Application purpose	Related parameters
General: working machine	Running state signal provided	F5.11- F5.12

Frequency set arrive to signal output

When the output frequency of inverter arrivea the setting frequency,once the signal output,it must offer external system or control circuit.

Applications	Application purpose	Related parameters
General: working machine	Running state signal provided	F5.11- F5.12

Torque signal output

Torque motor occurred, and beyond the detection value converter set, it will send a signal to prevent damage made by mechanical load.

Applications	Application purpose	Related parameters
Working machine,wind fan,pump,compressor	Mechanical protection, improve the operation reliability	F5.11-F5.12 FA.06-FA.08

Any frequency arrive to the signal output

Output frequency of inverter reach to any specified frequency, ,once the signal output,it must offer external system or control circuit.

Applications	Application purpose	Related parameters
General: working machine	Running state signal provided	F5.16 F5.17

Multi function analog output

The inverter operation frequency or output current, voltage signal, frequency meter, voltage meter can be added and displayed.

Applications	Application purpose	Related parameters
General	Display running state and information	F6.18-F6.22

Chapter VIII Maintenance

8.1 Daily Caring and Maintenance

The changes of inverter using environment, such as the influences of temperature, humidity and smog, and aging and other factors of inverter internal component may lead to various faults of inverter. Therefore, in storage and using process, it must take daily inspection and regular maintenance for the inverter.

When the inverter is started normally, please confirm the following items:

(1) Whether the motor has abnormal noise and vibration

(2) Whether the inverter and motor has abnormal heat radiation

(3)Whether the environment temperature is too high

(4)Whether the load current value is the same with past values

(5)Whether the cooling fan of inverter is in normal operation

8.2Regular Caring and Maintenance

(1)Regular Caring

To make the inverter operate normally for a long period, it must take caring and maintenance for the service life of internal electronic components of inverter. The service life of internal electronic components of inverter is varied due to different using environment and using conditions, as in Table 8-1. Caring period of inverter is provided only for reference.

Table 8-1 Replacement Time of Inverter Components

Component Name	Standard Replacement Years
Cooling fan	2-3 years
Electrolytic capacitor	4-5 years
Printed circuit board	5-8 years
Fuse	10 years

(2)regular Maintenances

When the inverter is taken regular maintenance and inspection, it must cut off the power. After the monitor has no display and the indicators of main circuit power are off, it can take inspection. The inspection contents are as in Table 8-2.

Inspection Item	Inspection Content	Countermeasures
Main circuit terminal, control loop terminal screws	Whether it is loose	Screw up with screwdriver
Air-cooling fin	Whether the airway is blocked by dust and foreign matters	Blow with 4-6kgcm2 pressure dry compressed air
Printed circuit board	Whether the surface has oil contamination and attachment of conductor scraps. Whether the copper foil is corrosion phenomena.	Clean the surface foreign matters of PCB board
Cooling fan	Whether the operation is normal, whether there is abnormal noise and abnormal vibration, and accumulated running time is up to more than 20,000hours	Replace cooling fan

Power element	Whether it has dust and attachment of oil contamination and other foreign matters	Clean foreign matters
Electrolytic capacitor	Whether it has leakage and bubbling phenomena, and the explosion-proof value has protrusion	Replace the electrolytic capacitor

Aimike (ShenZhen) Electric Co.,Ltd

Guarantee Card

Client: Purchasing Date:

Product Model: Body No.:

Address: 4th Floor of Building A6, Yinlong Industrial Park, No. 292, Shenshan Road, Longgang Town, Shenzhen City, Guangdong Province
Zip Code: 518116
Tel: +0086-755-84877366
Fax: +0086-755-89641102
Website: http://www.aimike.hk

Notes:

1. Please keep the card properly. Contact with after-sale service center and agent of Aimike relying on the card together with invoice when there is maintenance requirements.
2: We promise 12 months of guarantee period to the product.